US010124574B2

(12) **United States Patent**
Ono

(10) **Patent No.: US 10,124,574 B2**
(45) **Date of Patent: Nov. 13, 2018**

(54) **INFORMATION PROCESSING EQUIPMENT AND COMPUTER-READABLE RECORDING MEDIUM FOR PRESSING MULTIPLE COLORS OF METAL LEAF**

(71) Applicant: **Konica Minolta, Inc.**, Chiyoda-ku, Tokyo (JP)

(72) Inventor: **Koichi Ono**, Kasukabe (JP)

(73) Assignee: **KONICA MINOLTA, INC.**, Chiyoda-ku, Tokyo (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **15/697,710**

(22) Filed: **Sep. 7, 2017**

(65) **Prior Publication Data**

US 2018/0099498 A1 Apr. 12, 2018

(30) **Foreign Application Priority Data**

Oct. 12, 2016 (JP) 2016-200676

(51) **Int. Cl.**

B44C 1/14	(2006.01)
B41F 19/06	(2006.01)
B41F 19/00	(2006.01)
B41F 33/00	(2006.01)

(52) **U.S. Cl.**

CPC ***B41F 19/062*** (2013.01); ***B41F 19/00*** (2013.01); ***B41F 19/004*** (2013.01); ***B41F 33/00*** (2013.01); *B41P 2213/91* (2013.01); *B41P 2219/20* (2013.01); *B41P 2219/42* (2013.01); *B41P 2219/60* (2013.01)

(58) **Field of Classification Search**

CPC B41F 19/062; B41P 2219/20; G06K 15/1885; G06K 15/1889; H04N 5/2628; B44C 1/14; B44C 1/145

USPC 358/1.9, 1.5, 3.26, 1.12, 1.18

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,885,776	B2 *	4/2005	Takakura	G06T 3/4038 345/629
2013/0000830	A1 *	1/2013	Green	B44C 1/14 156/233

FOREIGN PATENT DOCUMENTS

JP	2006-224667	A	8/2006

* cited by examiner

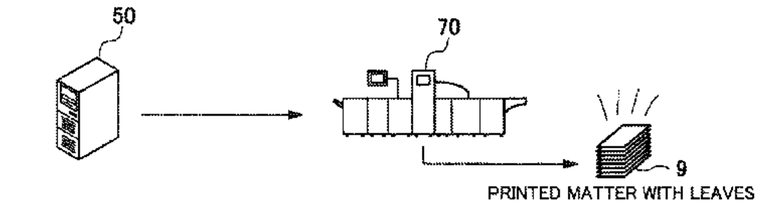
Primary Examiner — Jamares Q Washington

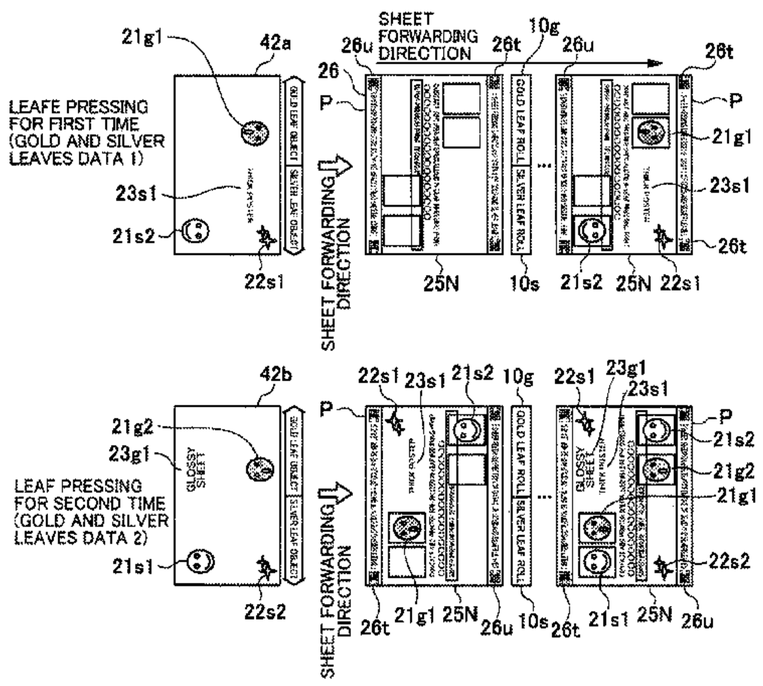
(74) *Attorney, Agent, or Firm* — Squire Patton Boggs (US) LLP

(57) **ABSTRACT**

According to one aspect of the present invention, when there is no leaf object striding over a boundary of two leaf rolls in a leaf image, a leaf image generating section performs processing for dividing first leaf image in first print data for leaves and a second leaf image of second print data for leaves at the boundary, replacing one of divided leaf images with one of other divided leaf images that hold the boundary between the first leaf image and the second leaf image to generate a first combined-leaves image and a second combined-leaves image, and rotating the second combined-leaves image at a predetermined angle.

15 Claims, 32 Drawing Sheets





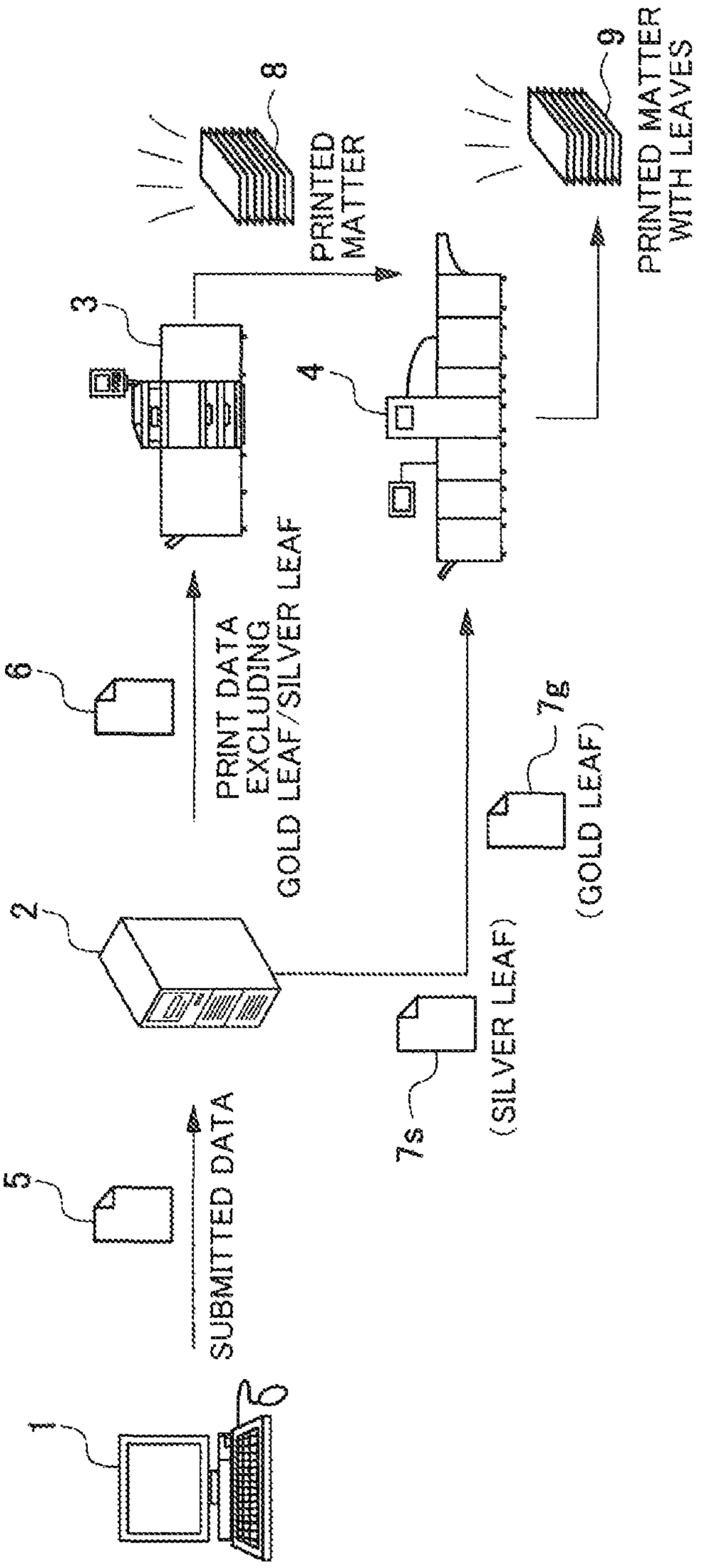

1
6
SUBMITTED DATA
5
PRINT DATA EXCLUDING GOLD LEAF/SILVER LEAF
6
2
7s
(SILVER LEAF)
7g
(GOLD LEAF)
4
3
PRINTED MATTER
8
PRINTED MATTER WITH LEAVES
9

FIG. 1

FIG. 2

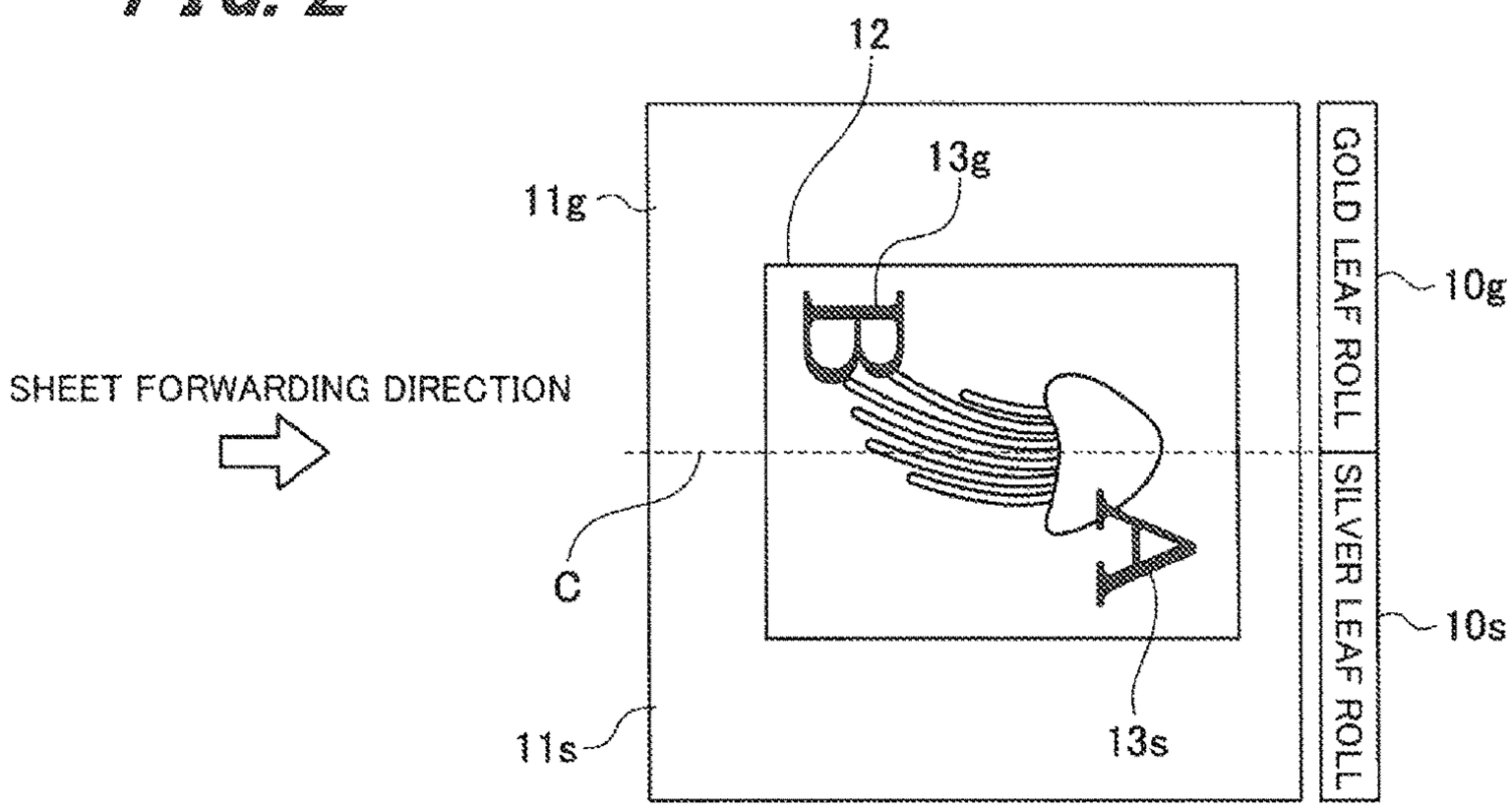

12
13g
11g
GOLD LEAF ROLL
10g
SHEET FORWARDING DIRECTION
C
SILVER LEAF ROLL
10s
11s
13s

FIG. 3

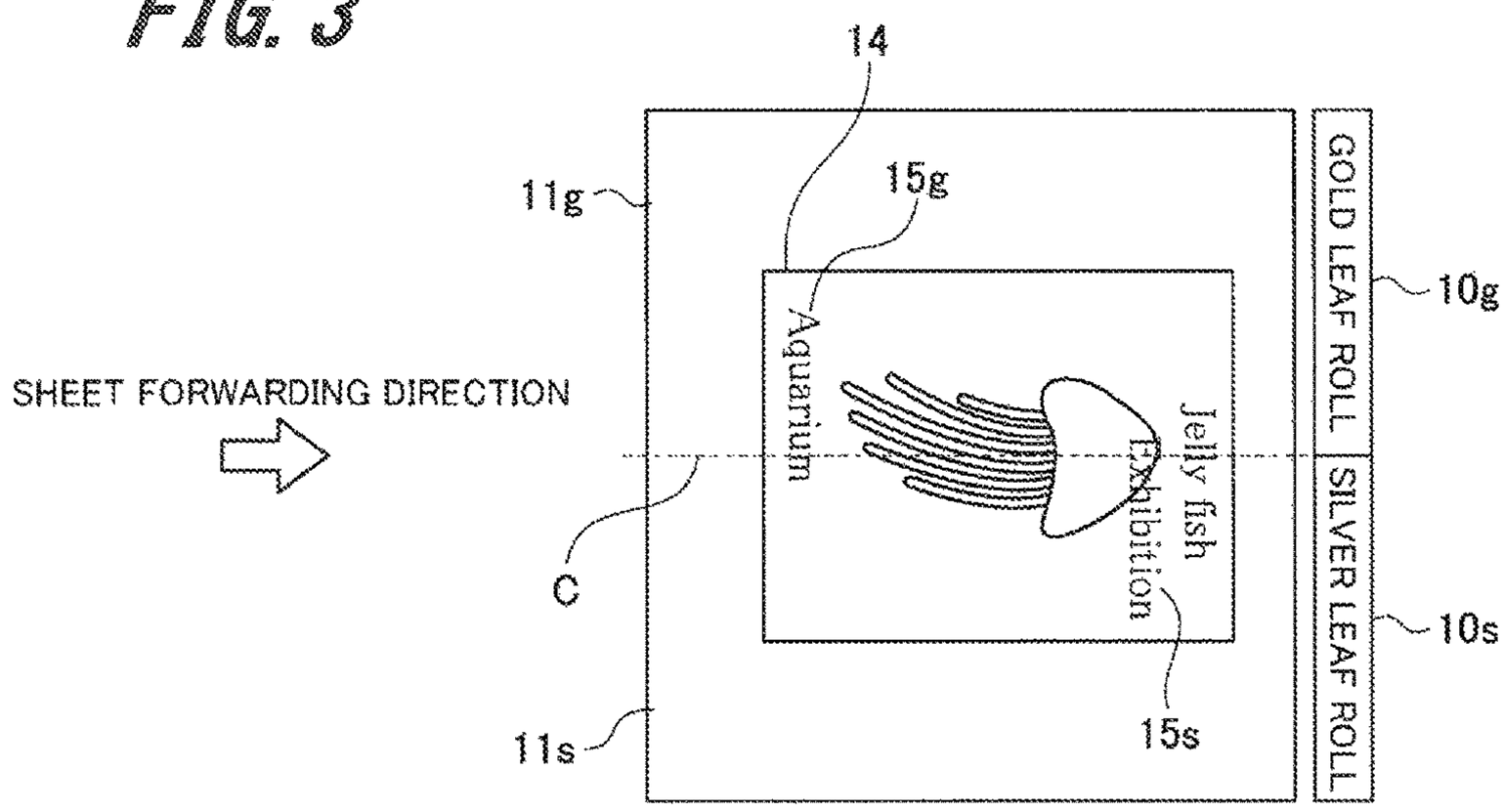
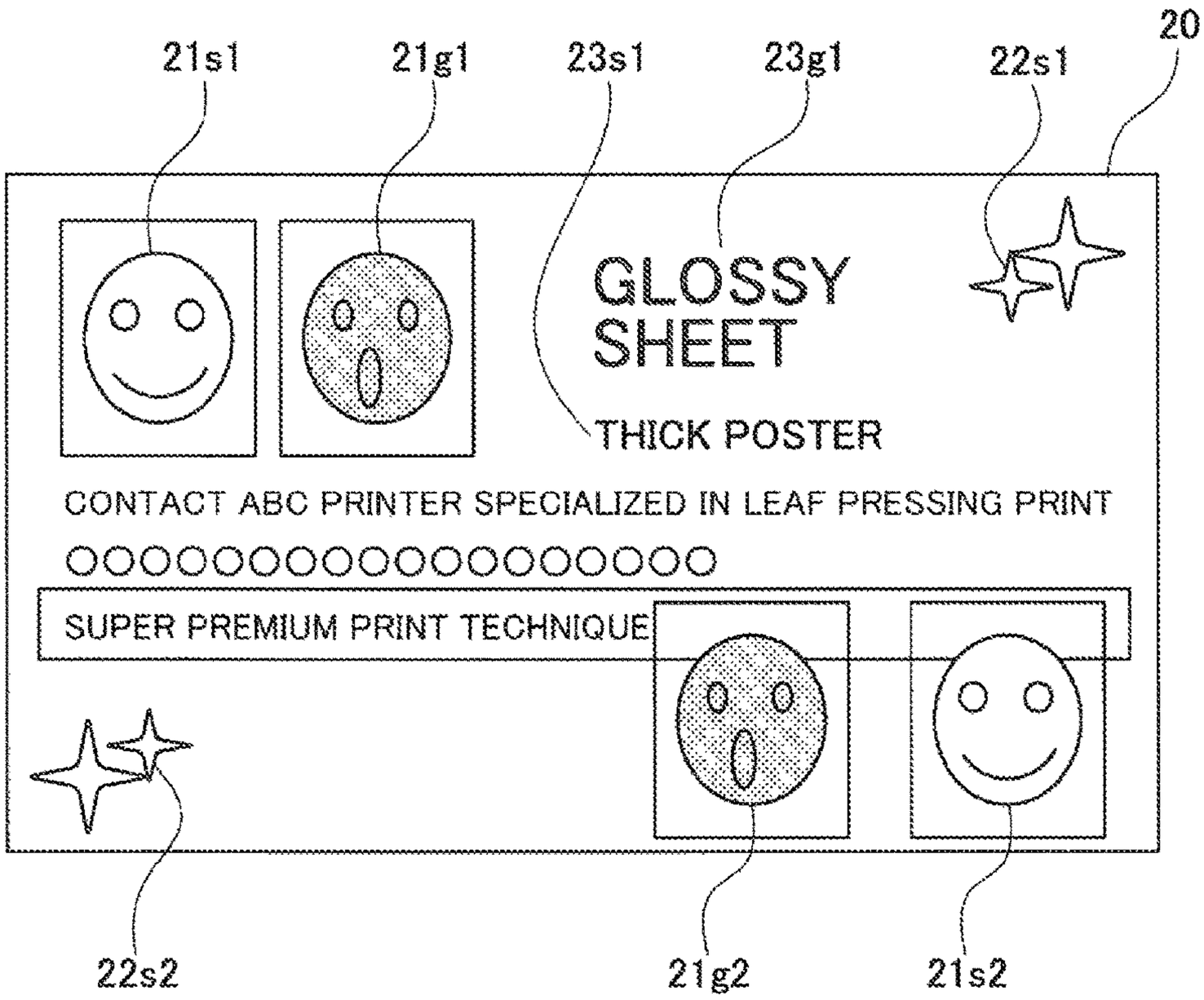

14
15g
11g
GOLD LEAF ROLL
10g
Aquarium
Jelly fish Exhibition
SHEET FORWARDING DIRECTION
C
SILVER LEAF ROLL
10s
11s
15s

FIG. 4


21s1
21g1
23s1
23g1
22s1
20
GLOSSY SHEET
THICK POSTER
CONTACT ABC PRINTER SPECIALIZED IN LEAF PRESSING PRINT
OOOOOOOOOOOOOOOOOO
SUPER PREMIUM PRINT TECHNIQUE
22s2
21g2
21s2

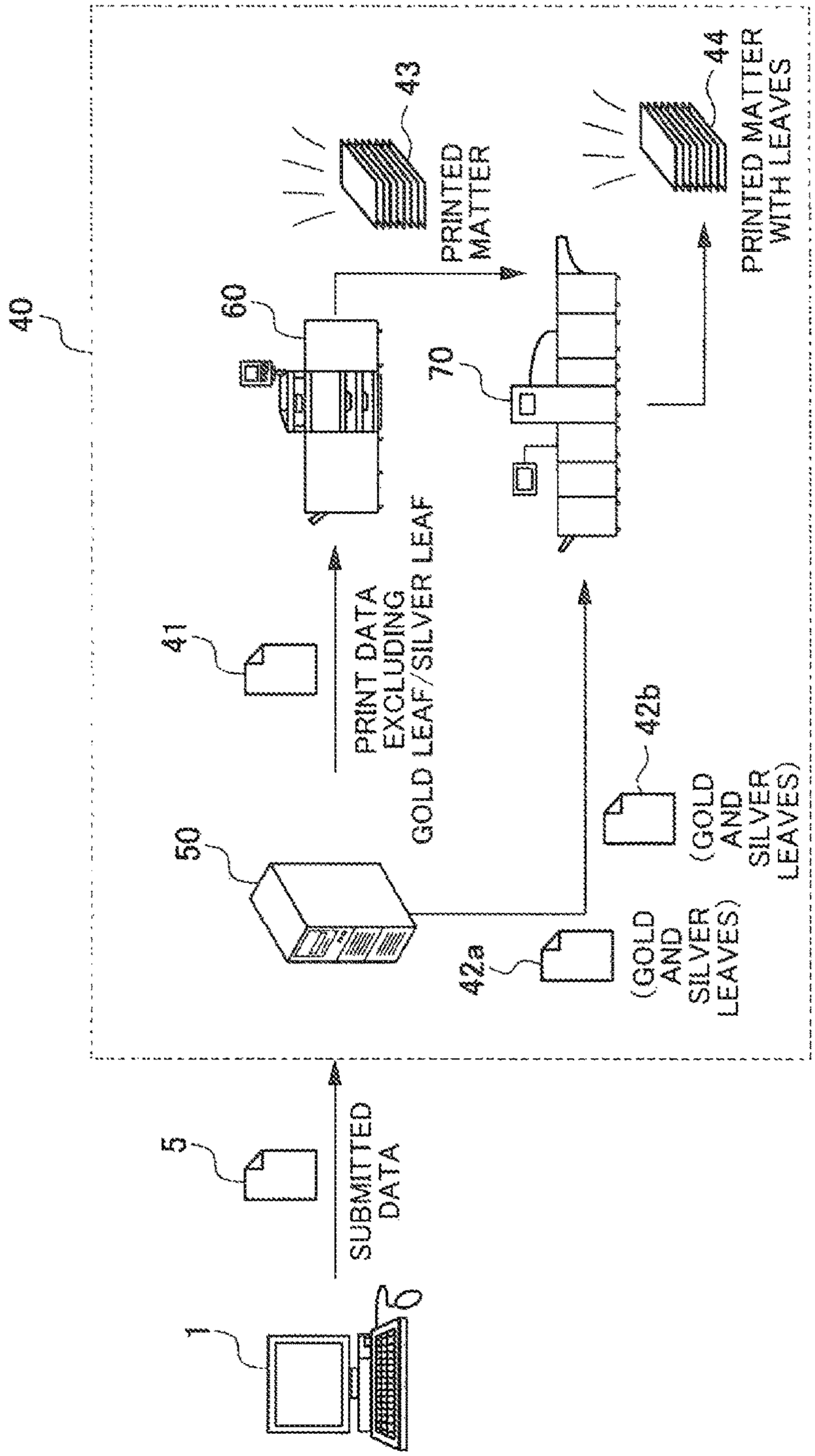

40
43
PRINTED MATTER
44
PRINTED MATTER WITH LEAVES
60
70
41
PRINT DATA EXCLUDING GOLD LEAF/SILVER LEAF
50
42b
(GOLD AND SILVER LEAVES)
42a
(GOLD AND SILVER LEAVES)
5
SUBMITTED DATA
1
6

FIG. 5

FIG. 6

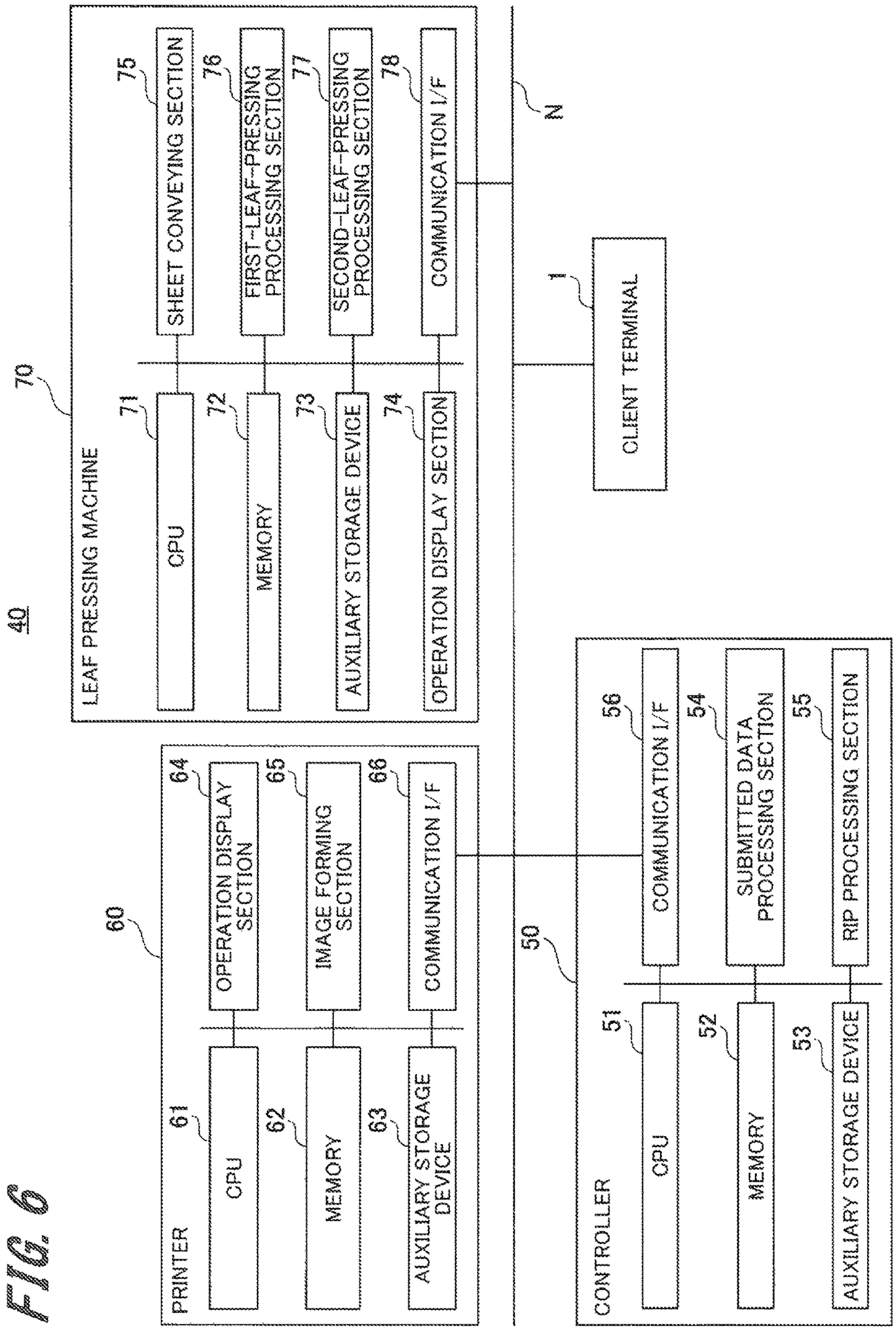

40
70
LEAF PRESSING MACHINE
71
CPU
72
MEMORY
73
AUXILIARY STORAGE DEVICE
74
OPERATION DISPLAY SECTION
75
SHEET CONVEYING SECTION
76
FIRST-LEAF-PRESSING PROCESSING SECTION
77
SECOND-LEAF-PRESSING PROCESSING SECTION
78
COMMUNICATION I/F
N
1
CLIENT TERMINAL
60
PRINTER
61
CPU
62
MEMORY
63
AUXILIARY STORAGE DEVICE
64
OPERATION DISPLAY SECTION
65
IMAGE FORMING SECTION
66
COMMUNICATION I/F
50
CONTROLLER
51
CPU
52
MEMORY
53
AUXILIARY STORAGE DEVICE
54
SUBMITTED DATA PROCESSING SECTION
55
RIP PROCESSING SECTION
56
COMMUNICATION I/F

FIG. 7

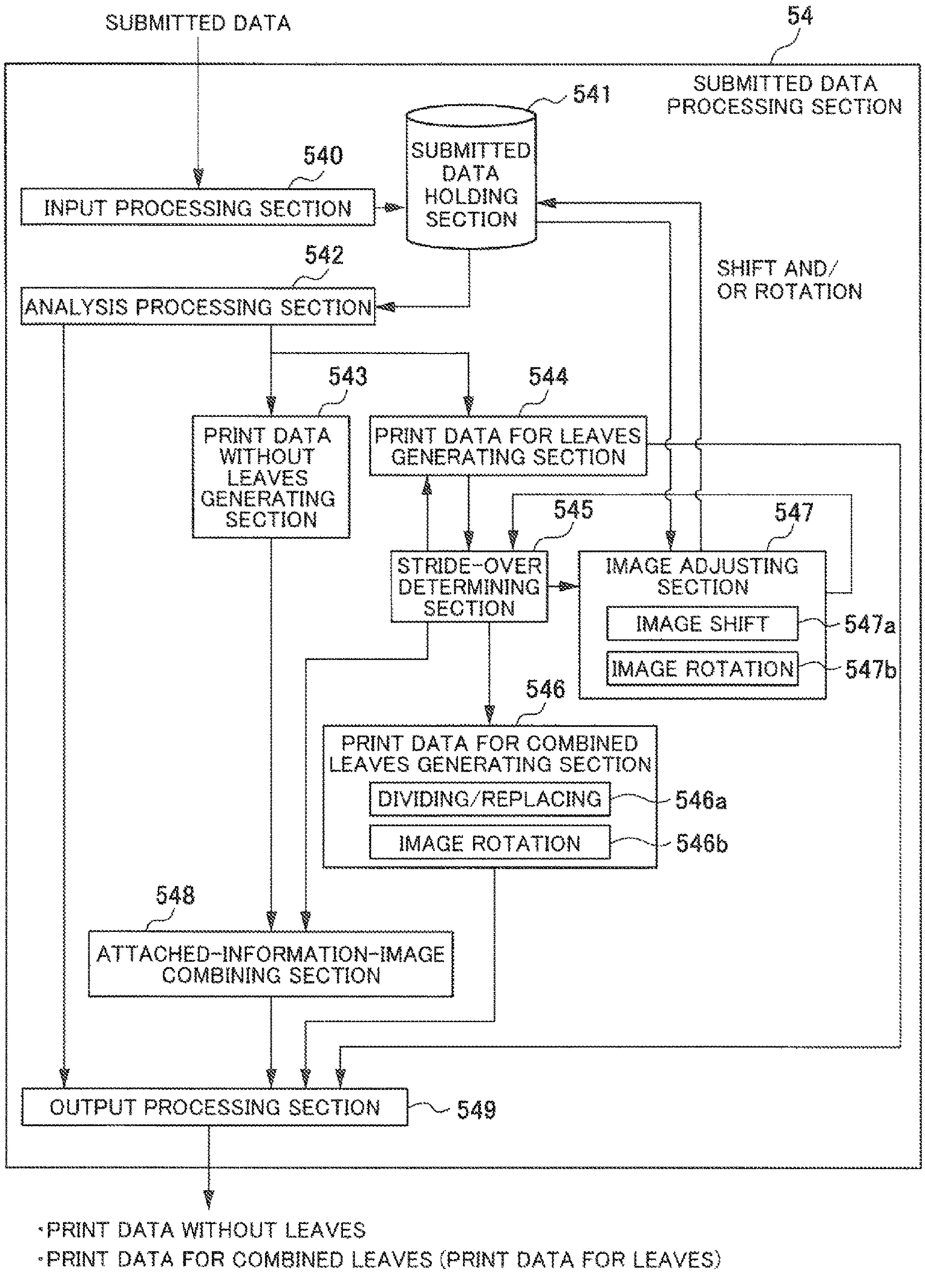

SUBMITTED DATA
54
SUBMITTED DATA PROCESSING SECTION
541
SUBMITTED DATA HOLDING SECTION
540
INPUT PROCESSING SECTION
542
ANALYSIS PROCESSING SECTION
SHIFT AND/OR ROTATION
543
PRINT DATA WITHOUT LEAVES GENERATING SECTION
544
PRINT DATA FOR LEAVES GENERATING SECTION
545
STRIDE-OVER DETERMINING SECTION
547
IMAGE ADJUSTING SECTION
IMAGE SHIFT
547a
IMAGE ROTATION
547b
546
PRINT DATA FOR COMBINED LEAVES GENERATING SECTION
DIVIDING/REPLACING
546a
IMAGE ROTATION
546b
548
ATTACHED-INFORMATION-IMAGE COMBINING SECTION
OUTPUT PROCESSING SECTION
549
•PRINT DATA WITHOUT LEAVES
•PRINT DATA FOR COMBINED LEAVES (PRINT DATA FOR LEAVES)

FIG. 8

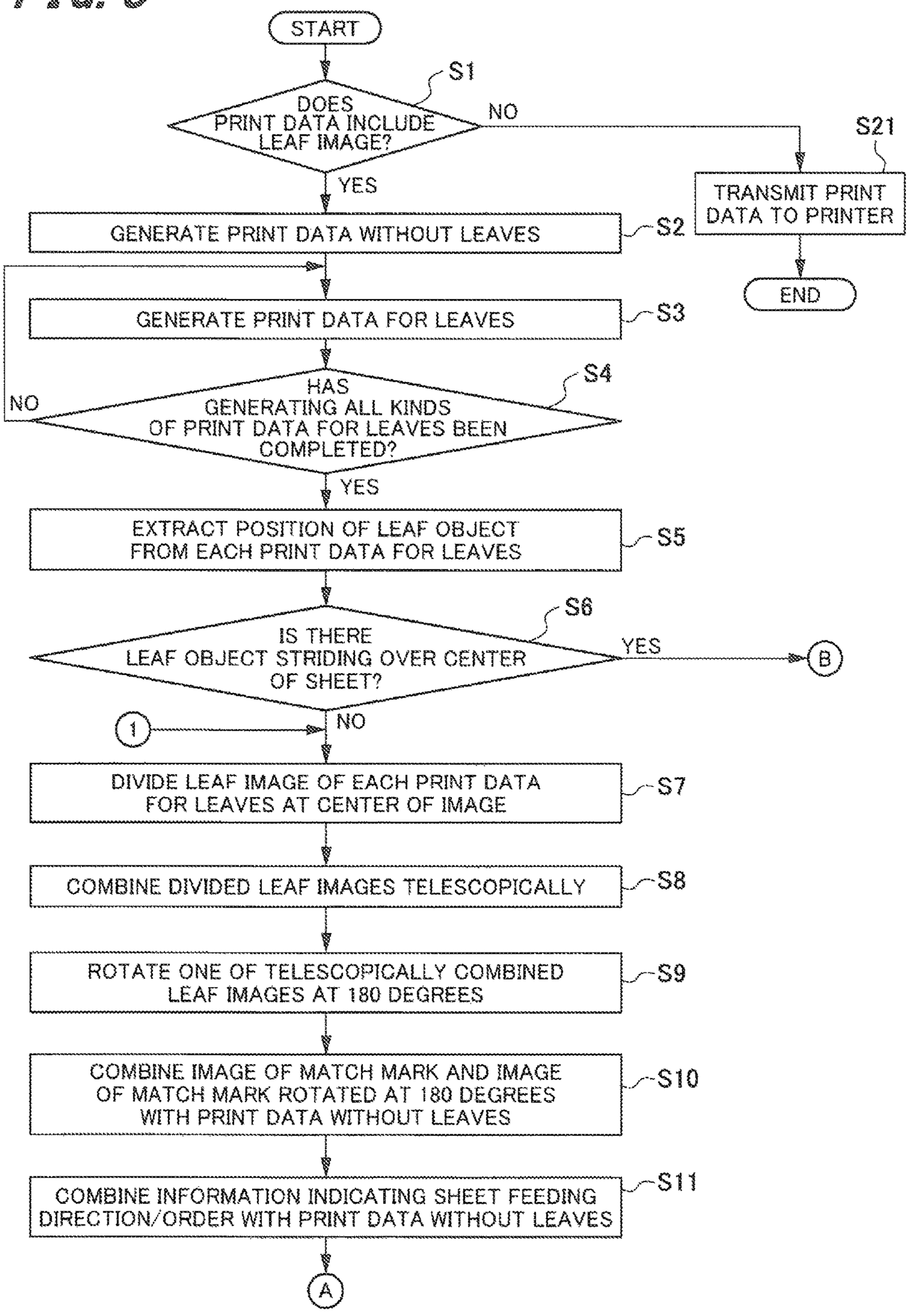

START
S1
DOES PRINT DATA INCLUDE LEAF IMAGE?
NO
YES
S21
TRANSMIT PRINT DATA TO PRINTER
END
GENERATE PRINT DATA WITHOUT LEAVES
S2
GENERATE PRINT DATA FOR LEAVES
S3
S4
HAS GENERATING ALL KINDS OF PRINT DATA FOR LEAVES BEEN COMPLETED?
NO
YES
EXTRACT POSITION OF LEAF OBJECT FROM EACH PRINT DATA FOR LEAVES
S5
S6
IS THERE LEAF OBJECT STRIDING OVER CENTER OF SHEET?
YES
B
1
NO
DIVIDE LEAF IMAGE OF EACH PRINT DATA FOR LEAVES AT CENTER OF IMAGE
S7
COMBINE DIVIDED LEAF IMAGES TELESCOPICALLY
S8
ROTATE ONE OF TELESCOPICALLY COMBINED LEAF IMAGES AT 180 DEGREES
S9
COMBINE IMAGE OF MATCH MARK AND IMAGE OF MATCH MARK ROTATED AT 180 DEGREES WITH PRINT DATA WITHOUT LEAVES
S10
COMBINE INFORMATION INDICATING SHEET FEEDING DIRECTION/ORDER WITH PRINT DATA WITHOUT LEAVES
S11
A

FIG. 9

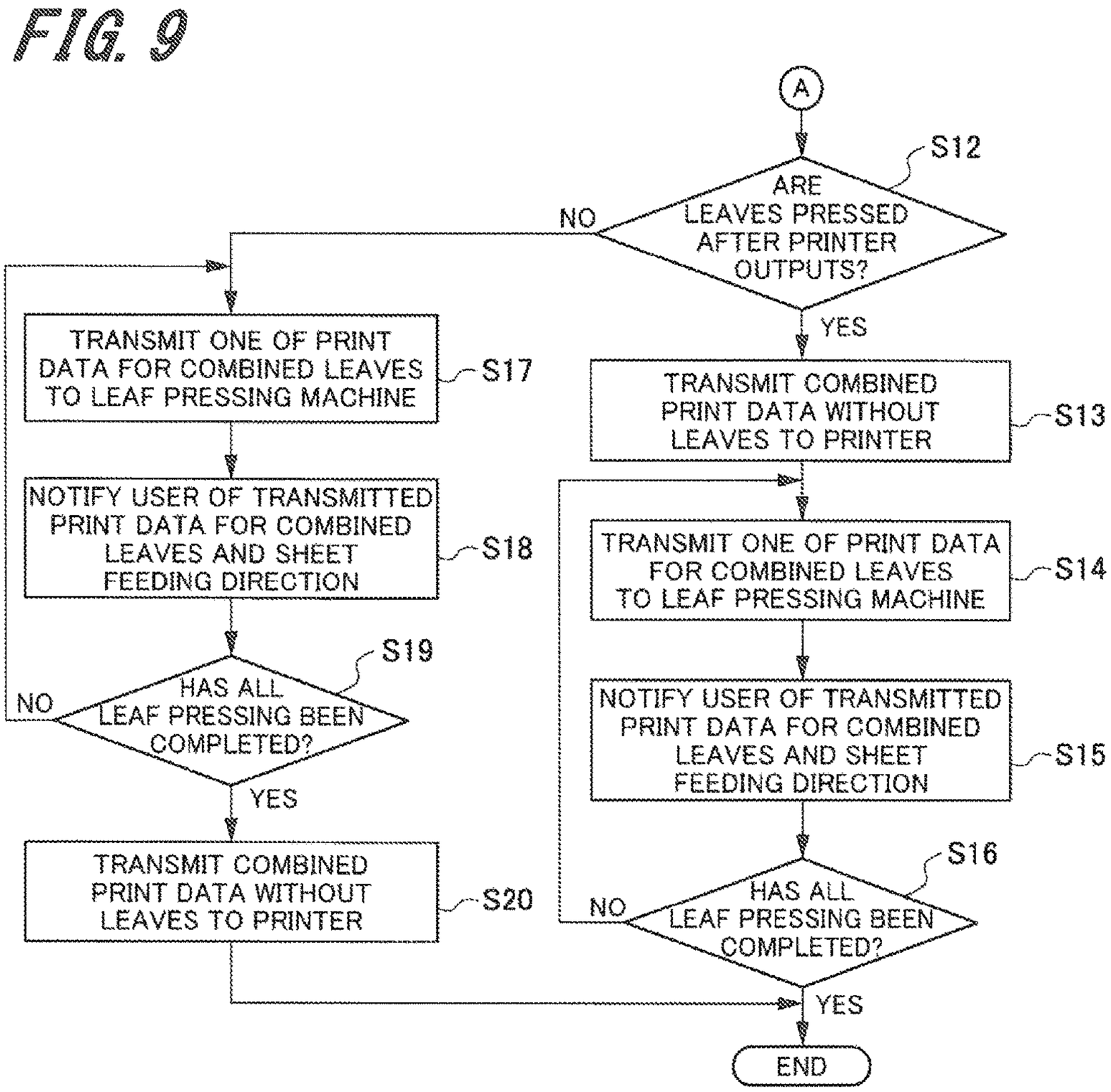

A
S12
ARE LEAVES PRESSED AFTER PRINTER OUTPUTS?
NO
YES
TRANSMIT COMBINED PRINT DATA WITHOUT LEAVES TO PRINTER
S13
TRANSMIT ONE OF PRINT DATA FOR COMBINED LEAVES TO LEAF PRESSING MACHINE
S14
NOTIFY USER OF TRANSMITTED PRINT DATA FOR COMBINED LEAVES AND SHEET FEEDING DIRECTION
S15
S16
HAS ALL LEAF PRESSING BEEN COMPLETED?
NO
YES
TRANSMIT ONE OF PRINT DATA FOR COMBINED LEAVES TO LEAF PRESSING MACHINE
S17
NOTIFY USER OF TRANSMITTED PRINT DATA FOR COMBINED LEAVES AND SHEET FEEDING DIRECTION
S18
S19
HAS ALL LEAF PRESSING BEEN COMPLETED?
NO
YES
TRANSMIT COMBINED PRINT DATA WITHOUT LEAVES TO PRINTER
S20
YES
END

FIG. 10

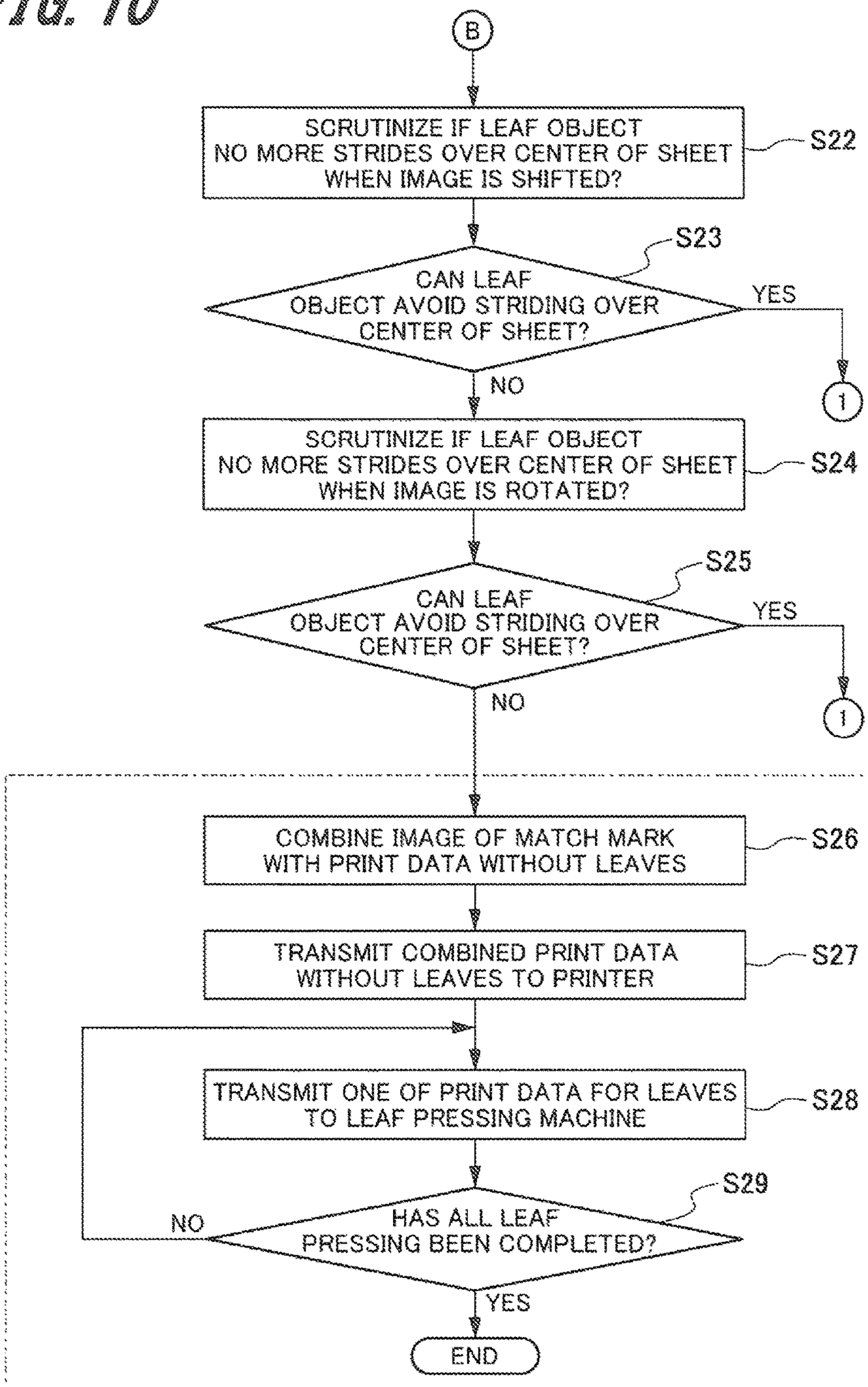
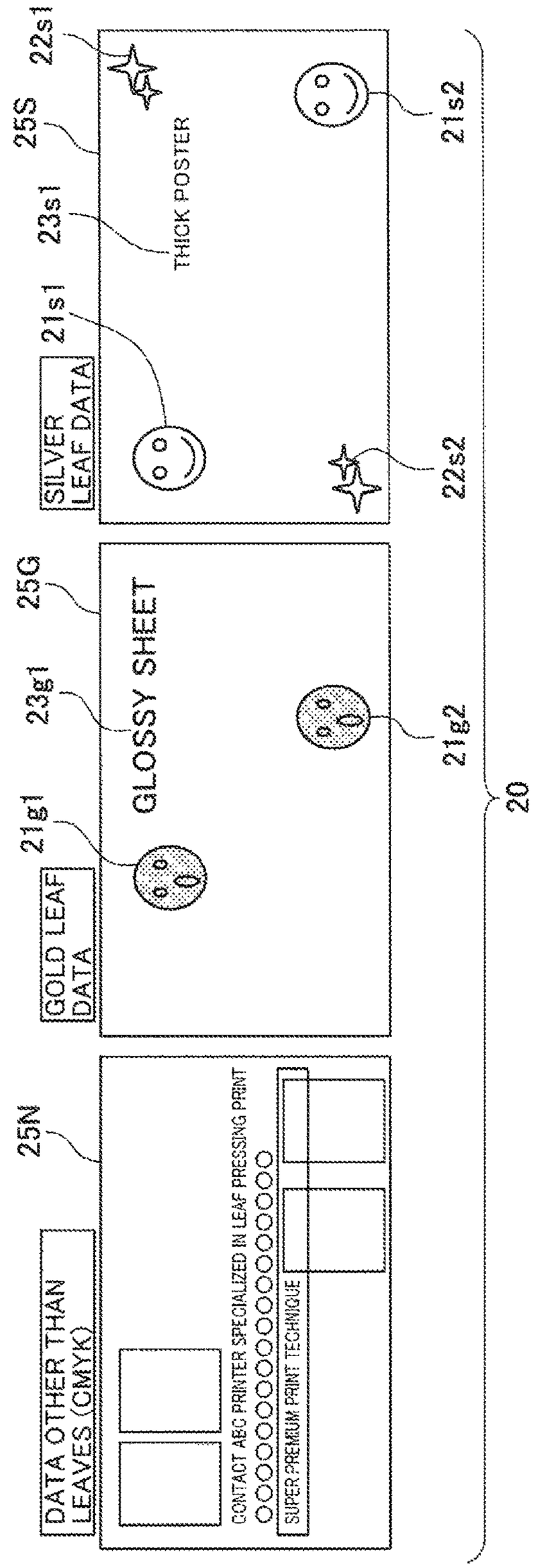

B
SCRUTINIZE IF LEAF OBJECT NO MORE STRIDES OVER CENTER OF SHEET WHEN IMAGE IS SHIFTED?
S22
S23
CAN LEAF OBJECT AVOID STRIDING OVER CENTER OF SHEET?
YES
NO
1
SCRUTINIZE IF LEAF OBJECT NO MORE STRIDES OVER CENTER OF SHEET WHEN IMAGE IS ROTATED?
S24
S25
CAN LEAF OBJECT AVOID STRIDING OVER CENTER OF SHEET?
YES
NO
1
COMBINE IMAGE OF MATCH MARK WITH PRINT DATA WITHOUT LEAVES
S26
TRANSMIT COMBINED PRINT DATA WITHOUT LEAVES TO PRINTER
S27
TRANSMIT ONE OF PRINT DATA FOR LEAVES TO LEAF PRESSING MACHINE
S28
S29
HAS ALL LEAF PRESSING BEEN COMPLETED?
NO
YES
END

FIG. 11


22s1
25S
THICK POSTER
21s2
23s1
21s1
SILVER LEAF DATA
22s2
25G
23g1
GLOSSY SHEET
21g2
21g1
GOLD LEAF DATA
20
25N
DATA OTHER THAN LEAVES (CMYK)
CONTACT ABC PRINTER SPECIALIZED IN LEAF PRESSING PRINT
SUPER PREMIUM PRINT TECHNIQUE

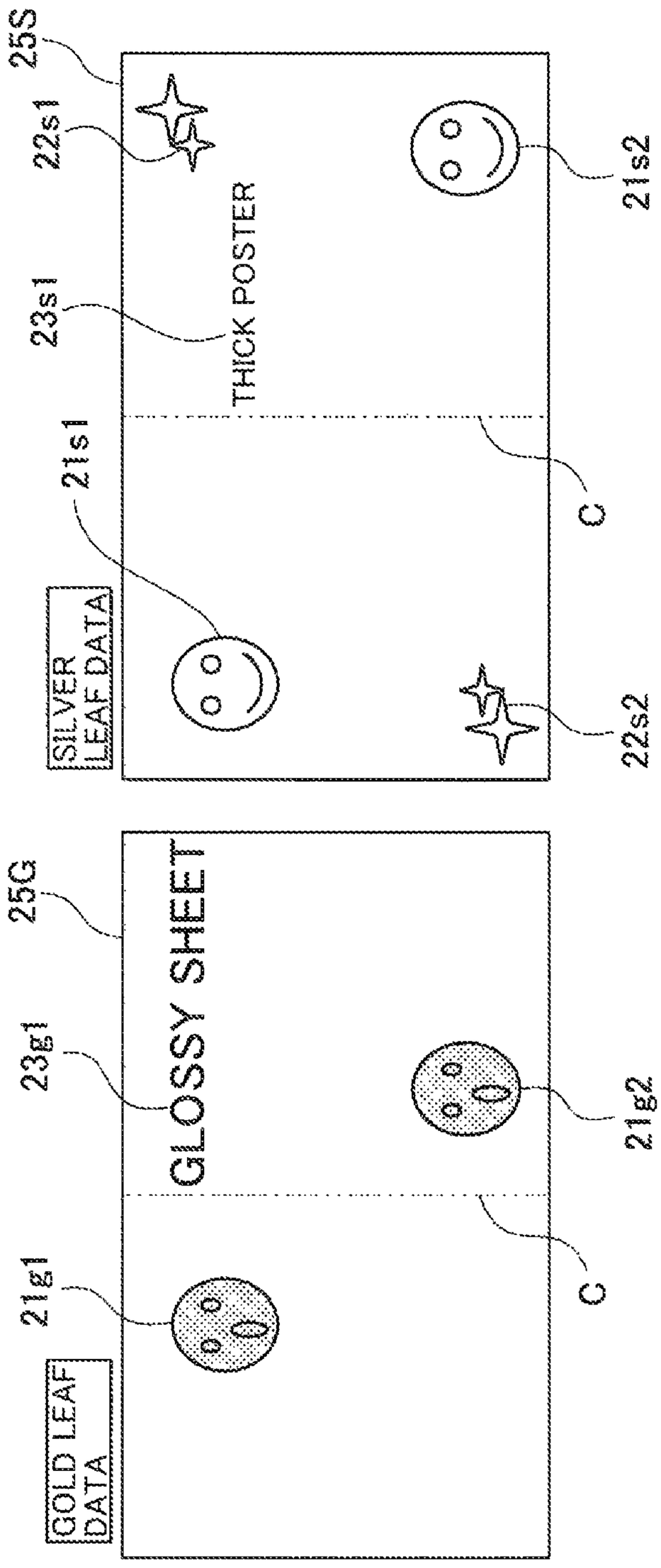
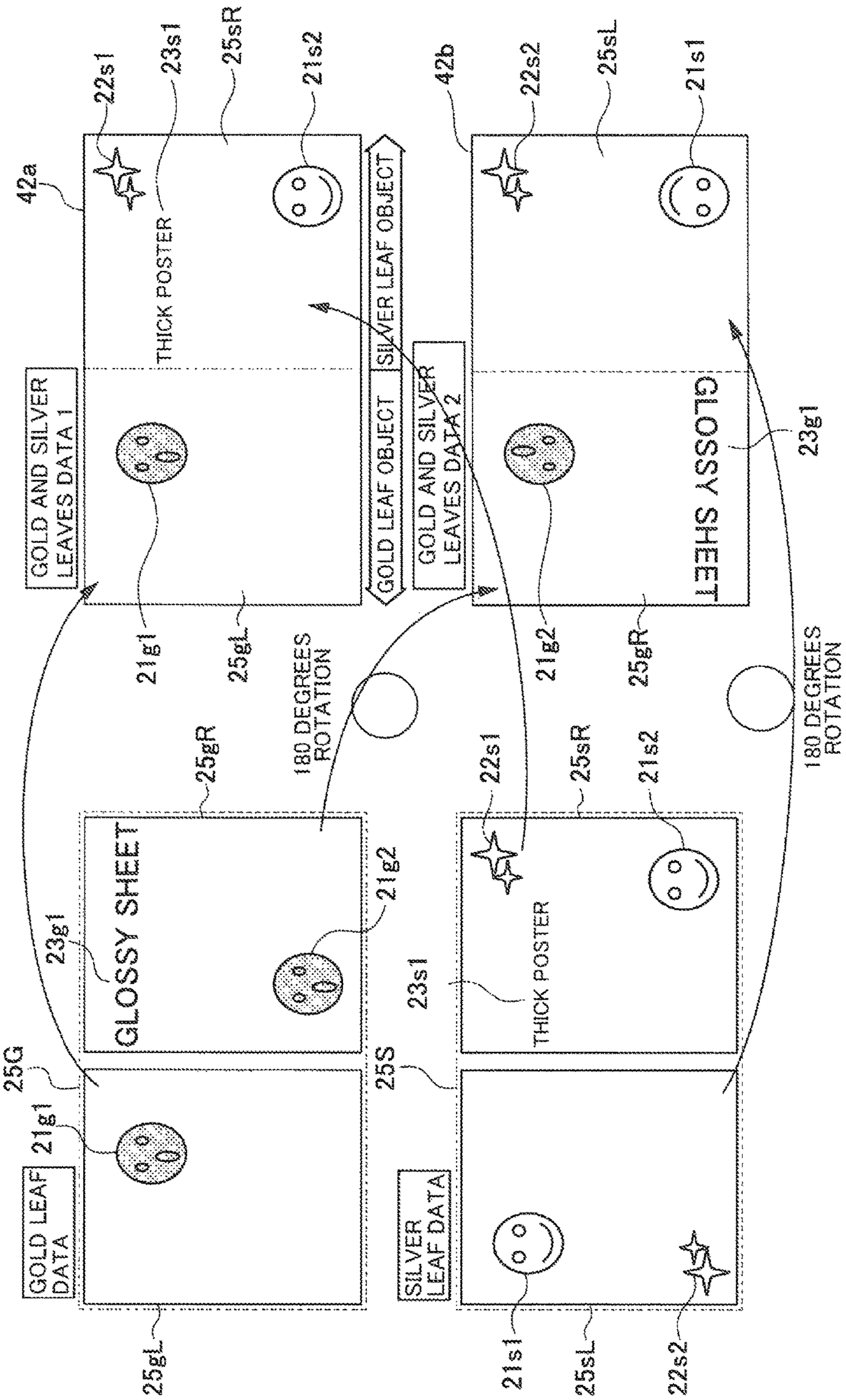

25S
22s1
23s1
THICK POSTER
21s2
C
SILVER LEAF DATA
21s1
22s2
25G
23g1
GLOSSY SHEET
21g2
C
21g1
GOLD LEAF DATA

FIG. 12

FIG. 13


42a
22s1
23s1
25sR
21s2
THICK POSTER
GOLD AND SILVER LEAVES DATA 1
GOLD LEAF OBJECT
SILVER LEAF OBJECT
21g1
25gL
180 DEGREES ROTATION
25gR
GLOSSY SHEET
21g2
23g1
25G
GOLD LEAF DATA
42b
22s2
25sL
21s1
GOLD AND SILVER LEAVES DATA 2
25S
SILVER LEAF DATA

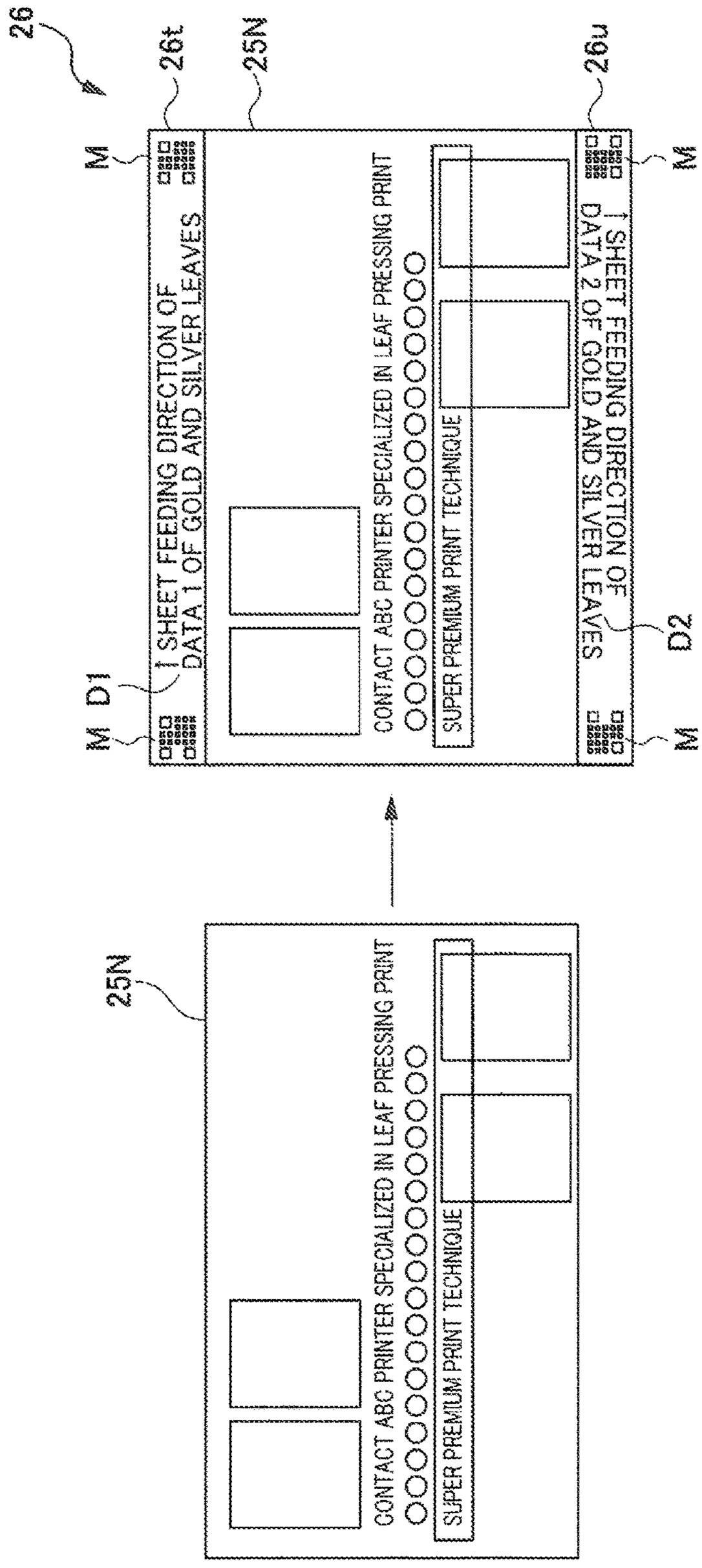

26
26t
25N
26u
M
M
1 SHEET FEEDING DIRECTION OF
DATA 1 OF GOLD AND SILVER LEAVES
CONTACT ABC PRINTER SPECIALIZED IN LEAF PRESSING PRINT
OOOOOOOOOOOOOOOO
SUPER PREMIUM PRINT TECHNIQUE
SHEET FEEDING DIRECTION OF
DATA 2 OF GOLD AND SILVER LEAVES
M D1
M D2
25N

FIG. 14

FIG. 15

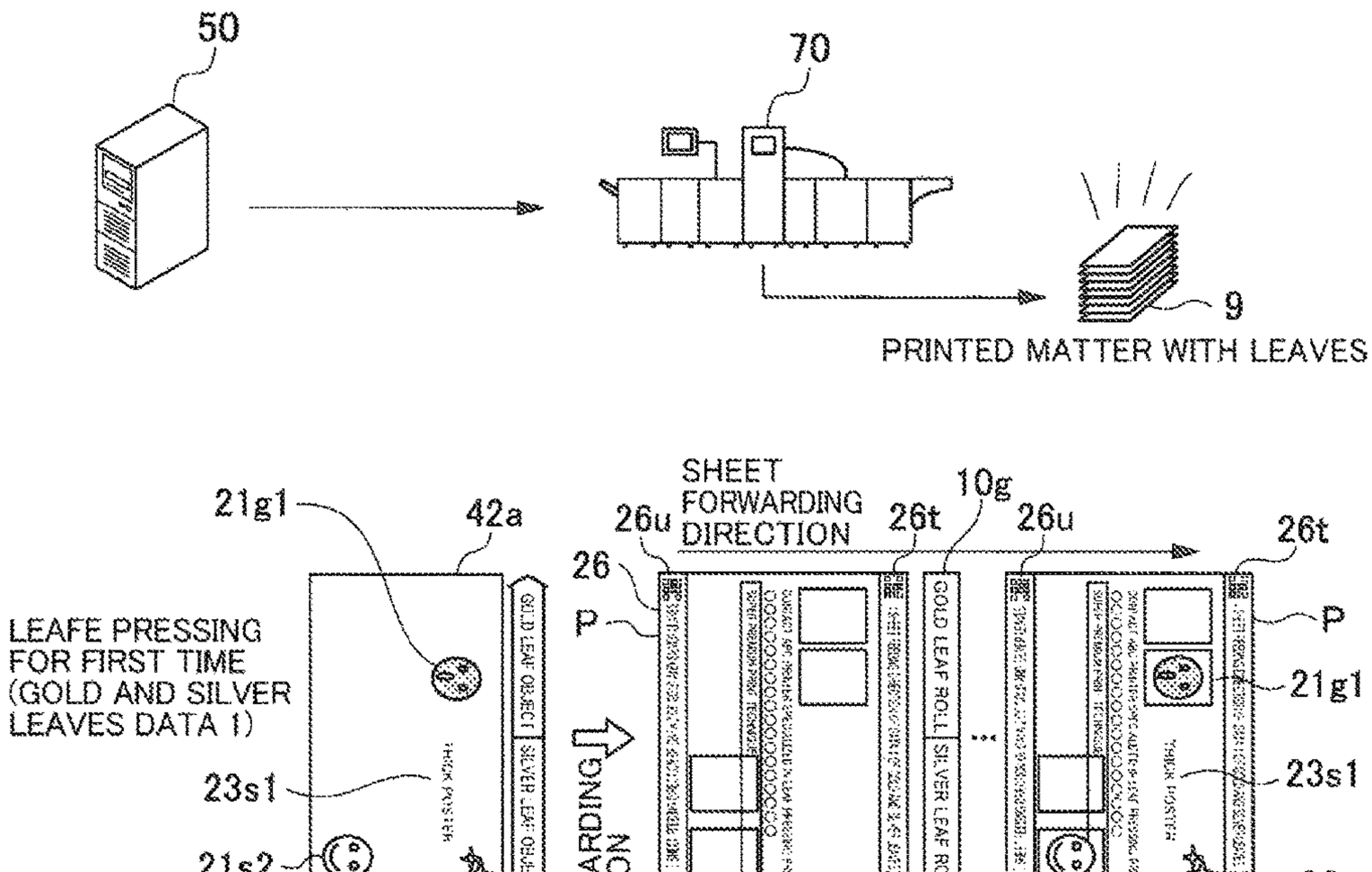
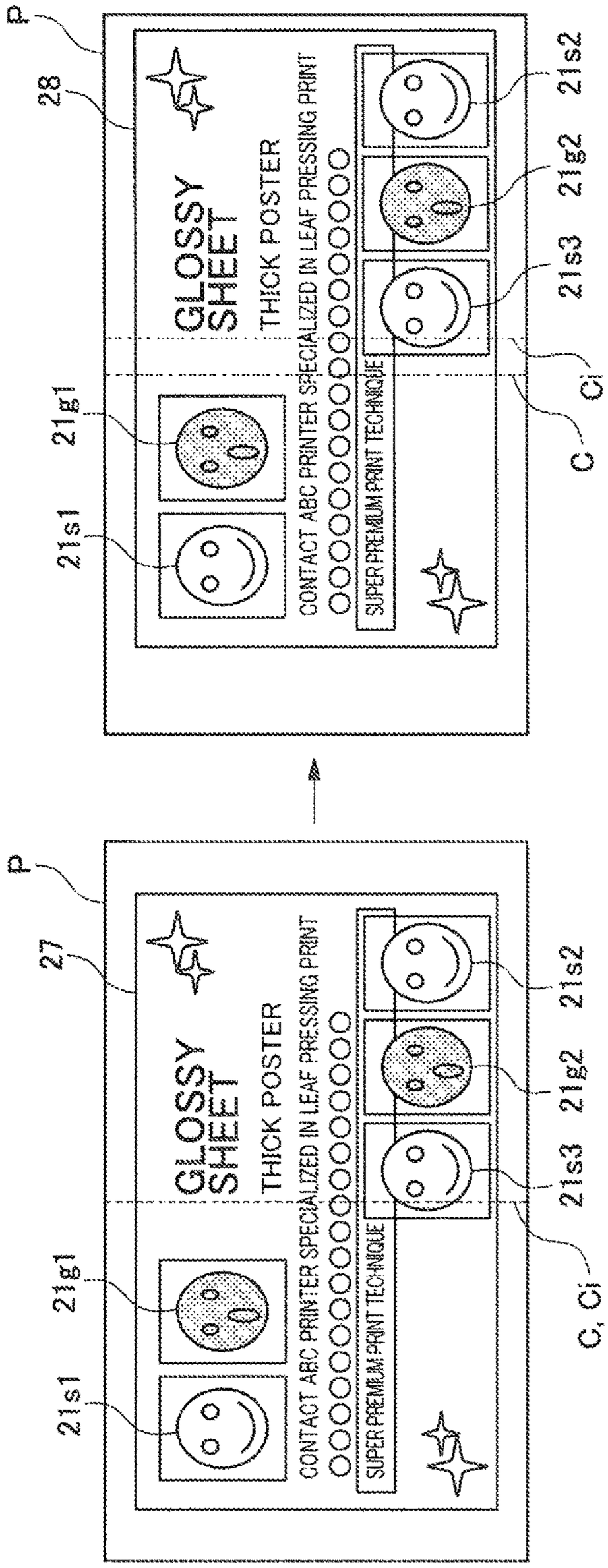

50
70
9
PRINTED MATTER WITH LEAVES
LEAFE PRESSING FOR FIRST TIME (GOLD AND SILVER LEAVES DATA 1)
21g1
42a
23s1
21s2
22s1
SHEET FORWARDING DIRECTION
26u
26t
10g
26
P
GOLD LEAF ROLL
SILVER LEAF ROLL
25N
10s
LEAF PRESSING FOR SECOND TIME (GOLD AND SILVER LEAVES DATA 2)
42b
21g2
23g1
21s1
22s2
GLOSSY SHEET
22s1
23s1
21s2
23g1
21g1
22s2

FIG. 16


P
28
GLOSSY SHEET
THICK POSTER
CONTACT ABC PRINTER SPECIALIZED IN LEAF PRESSING PRINT
SUPER PREMIUM PRINT TECHNIQUE
21s1
21g1
21g2
21s2
21s3
C
Ci
27
C, Ci

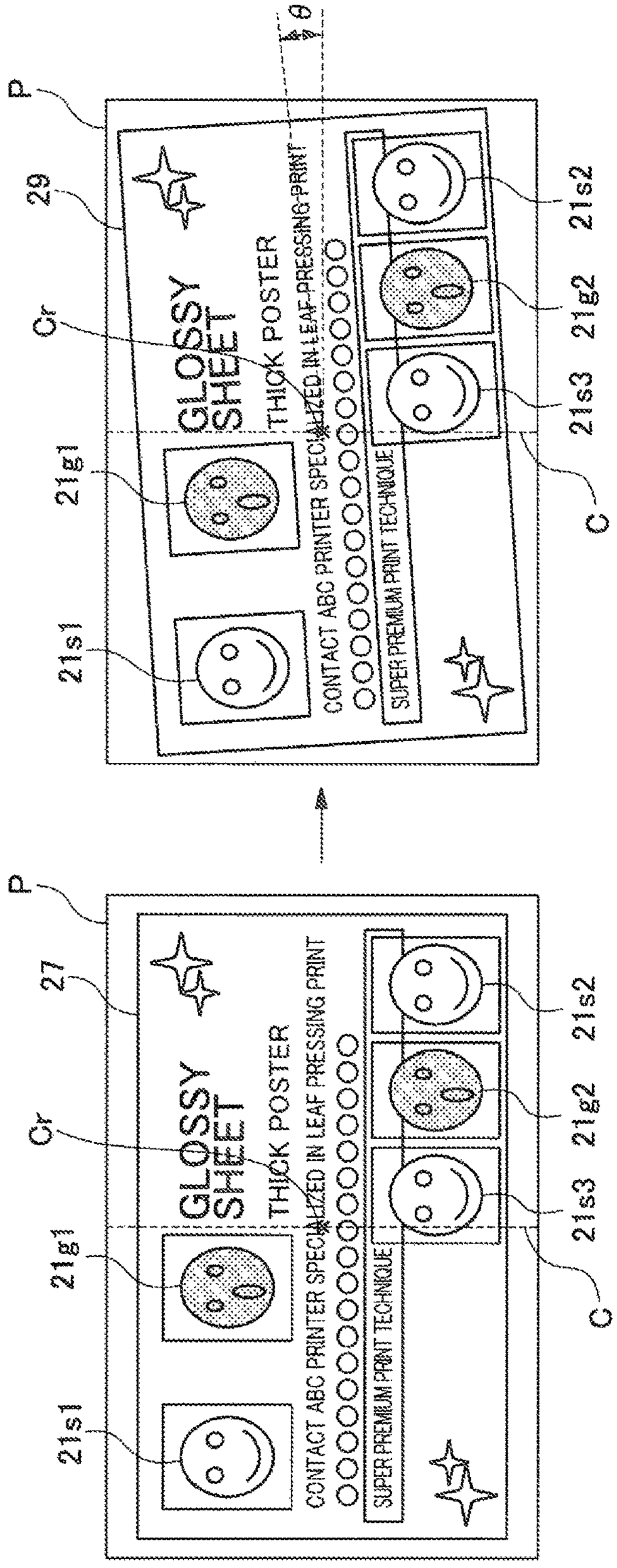

P
29
Cr
21g1
21s1
GLOSSY SHEET
THICK POSTER
CONTACT ABC PRINTER SPECIALIZED IN LEAF-PRESSING-PRINT
SUPER PREMIUM PRINT TECHNIQUE
21s2
21g2
21s3
C
P
27
Cr
21g1
21s1
GLOSSY SHEET
THICK POSTER
CONTACT ABC PRINTER SPECIALIZED IN LEAF PRESSING PRINT
SUPER PREMIUM PRINT TECHNIQUE
21s2
21g2
21s3
C

FIG. 17

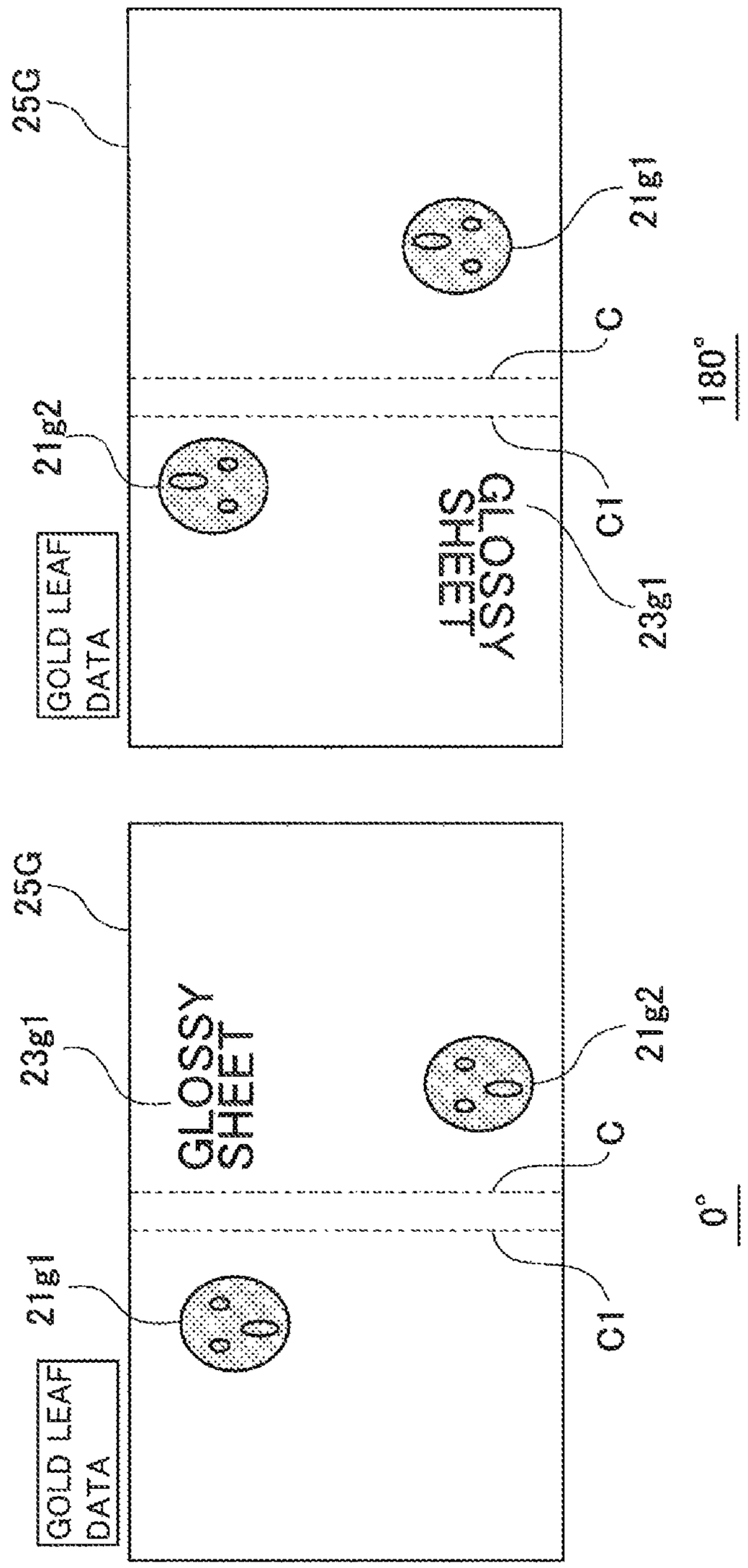

25C
21g1
C
180°
21g2
GOLD LEAF DATA
GLOSSY SHEET
C1
23g1
25G
23g1
GLOSSY SHEET
21g2
C
0°
21g1
GOLD LEAF DATA
C1

FIG. 18

FIG. 19

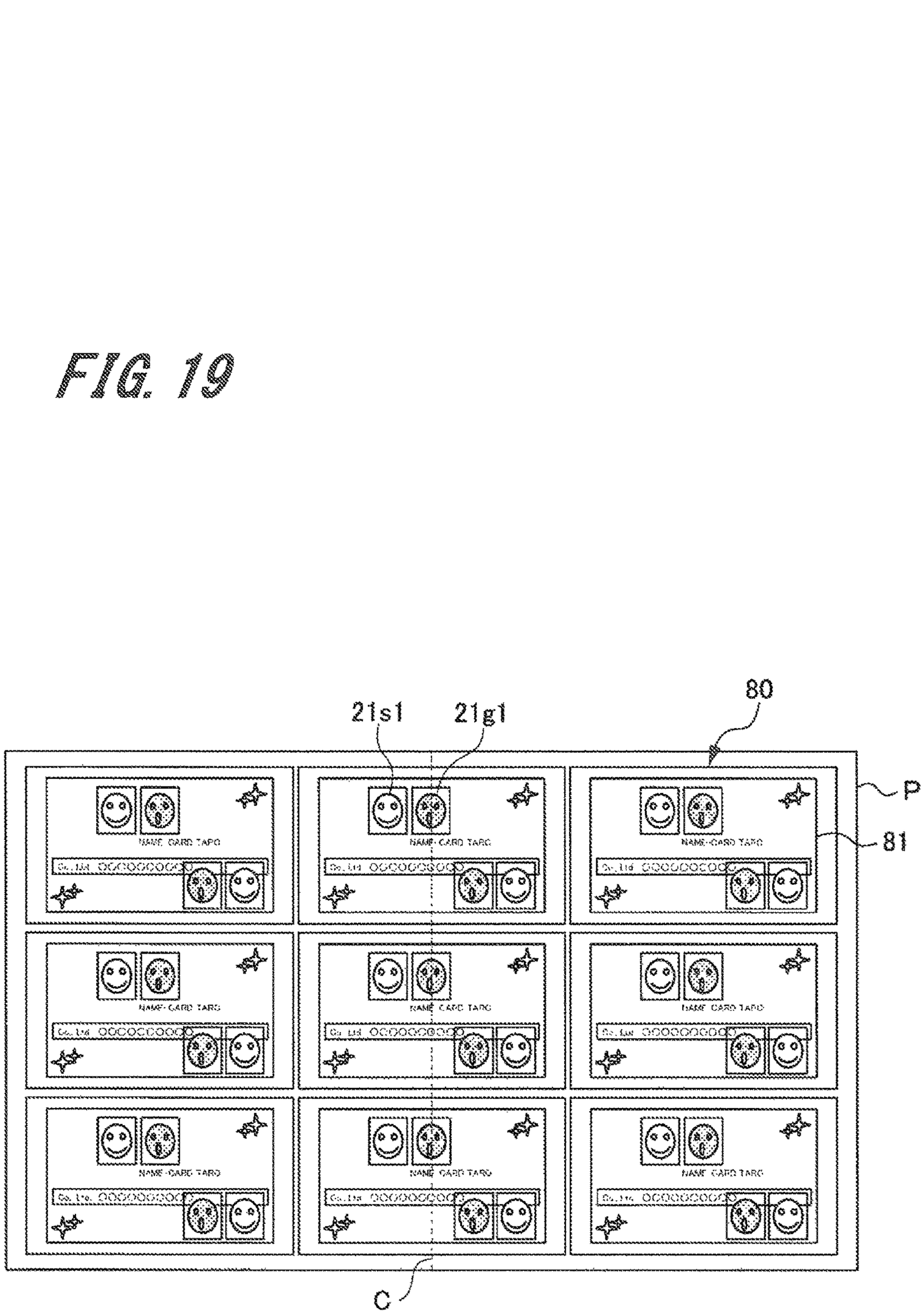


FIG. 20

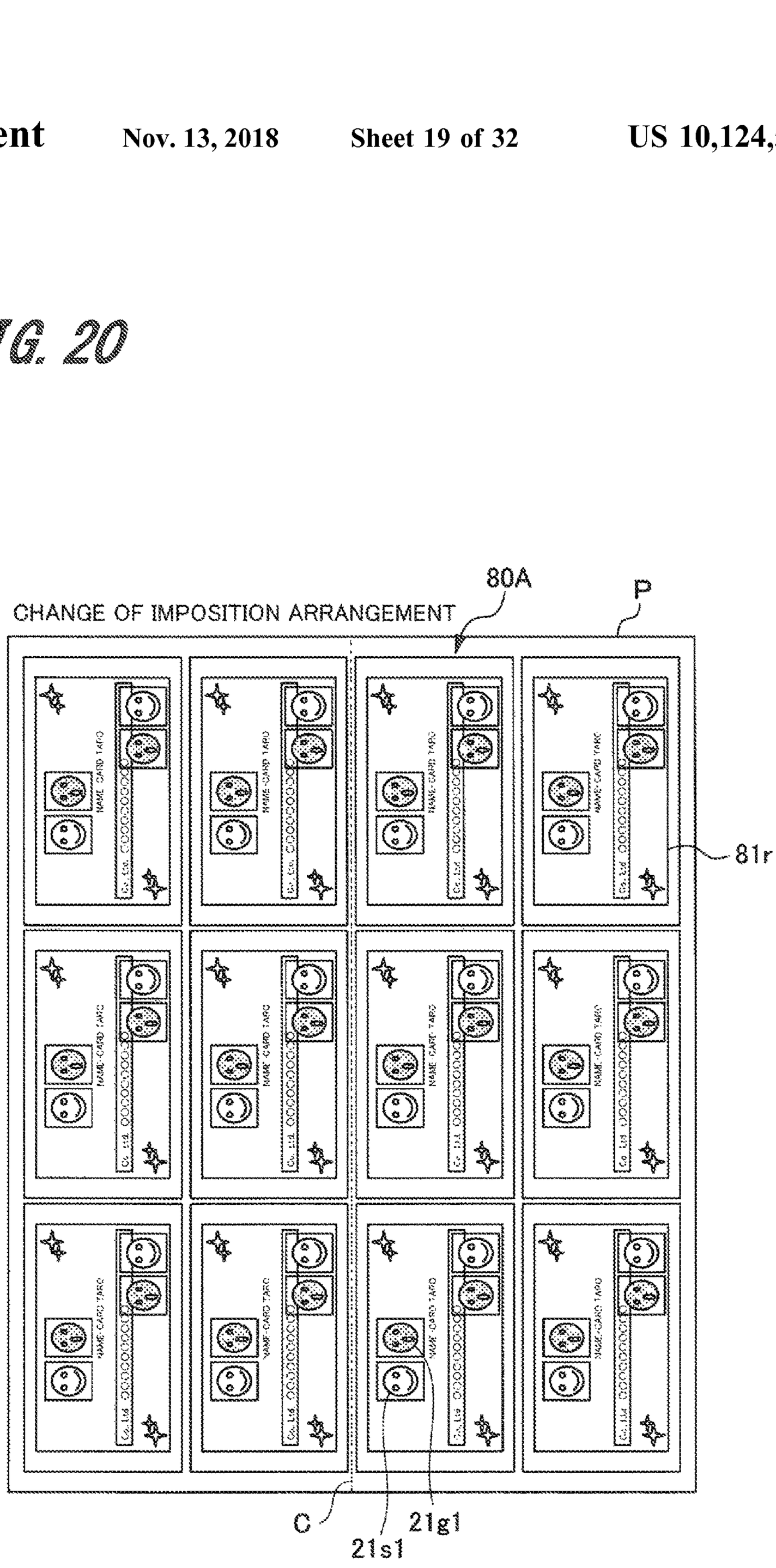


FIG. 21

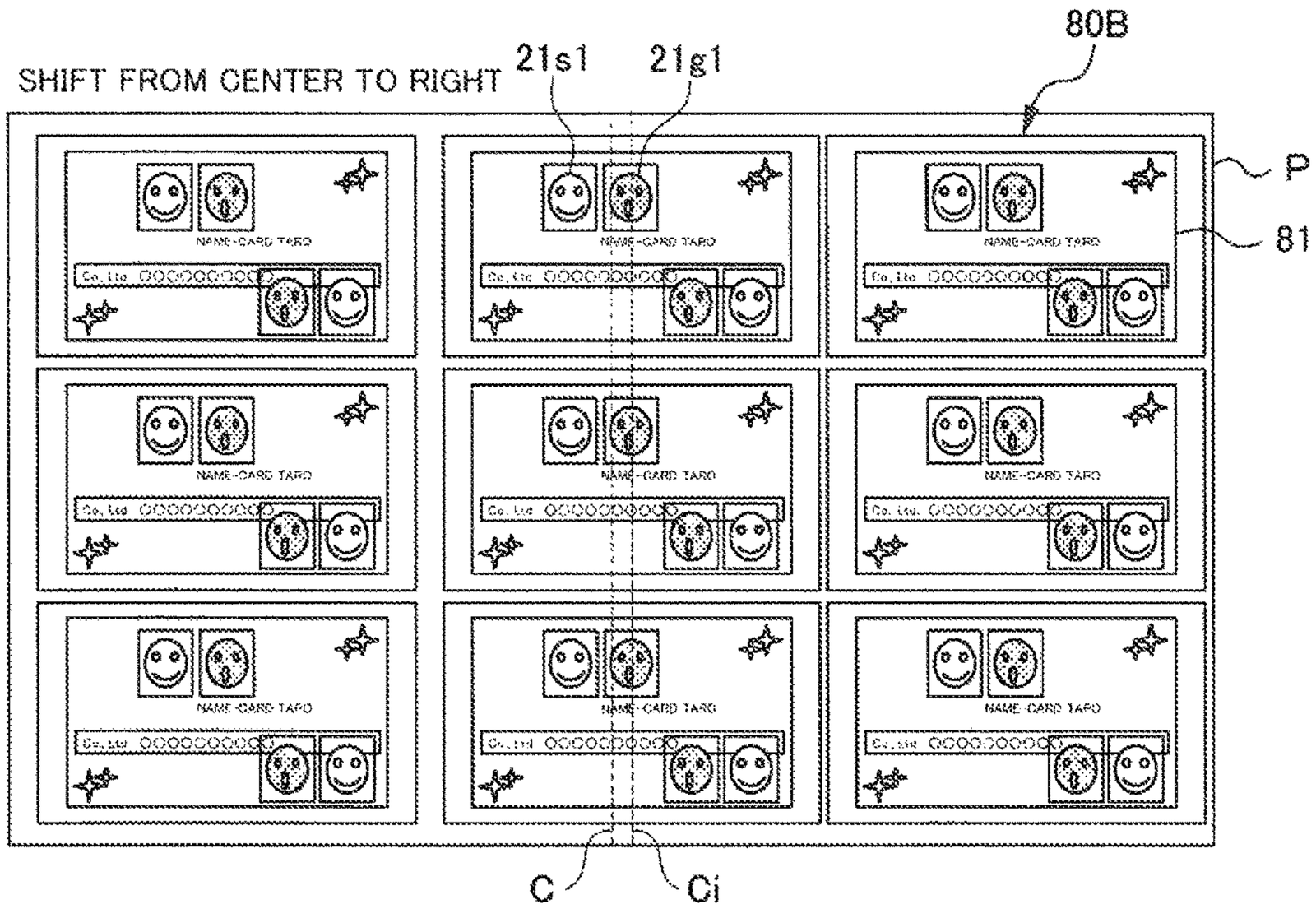


FIG. 22

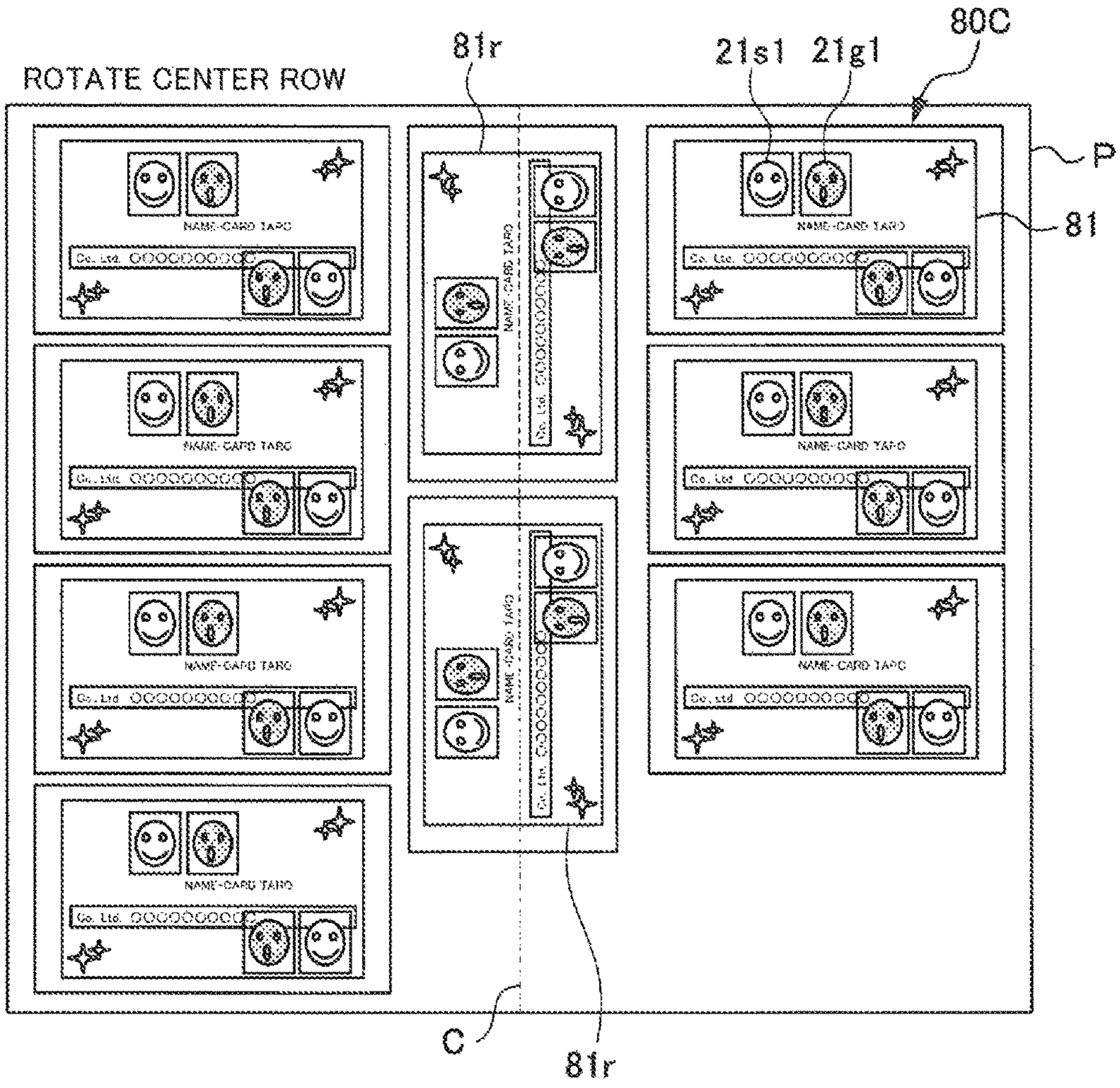

ROTATE CENTER ROW
81r
21s1
21g1
80C
P
81
NAME-CARD TARO
Co. Ltd.
C
81r

FIG. 23

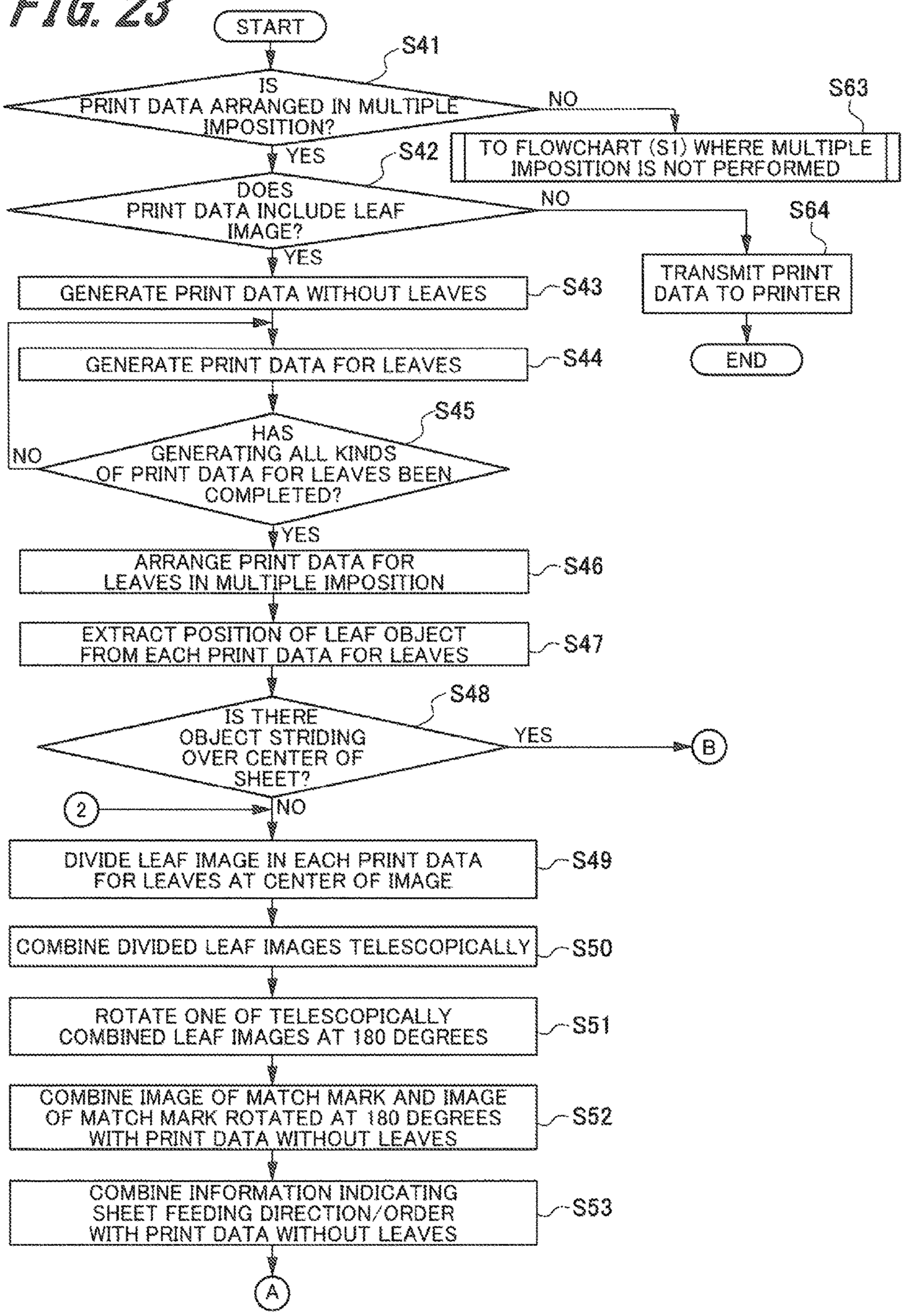

START
S41
IS PRINT DATA ARRANGED IN MULTIPLE IMPOSITION?
NO
S63
TO FLOWCHART (S1) WHERE MULTIPLE IMPOSITION IS NOT PERFORMED
YES
S42
DOES PRINT DATA INCLUDE LEAF IMAGE?
NO
S64
TRANSMIT PRINT DATA TO PRINTER
YES
GENERATE PRINT DATA WITHOUT LEAVES
S43
END
GENERATE PRINT DATA FOR LEAVES
S44
S45
HAS GENERATING ALL KINDS OF PRINT DATA FOR LEAVES BEEN COMPLETED?
NO
YES
ARRANGE PRINT DATA FOR LEAVES IN MULTIPLE IMPOSITION
S46
EXTRACT POSITION OF LEAF OBJECT FROM EACH PRINT DATA FOR LEAVES
S47
S48
IS THERE OBJECT STRIDING OVER CENTER OF SHEET?
YES
B
2
NO
DIVIDE LEAF IMAGE IN EACH PRINT DATA FOR LEAVES AT CENTER OF IMAGE
S49
COMBINE DIVIDED LEAF IMAGES TELESCOPICALLY
S50
ROTATE ONE OF TELESCOPICALLY COMBINED LEAF IMAGES AT 180 DEGREES
S51
COMBINE IMAGE OF MATCH MARK AND IMAGE OF MATCH MARK ROTATED AT 180 DEGREES WITH PRINT DATA WITHOUT LEAVES
S52
COMBINE INFORMATION INDICATING SHEET FEEDING DIRECTION/ORDER WITH PRINT DATA WITHOUT LEAVES
S53
A

FIG. 24

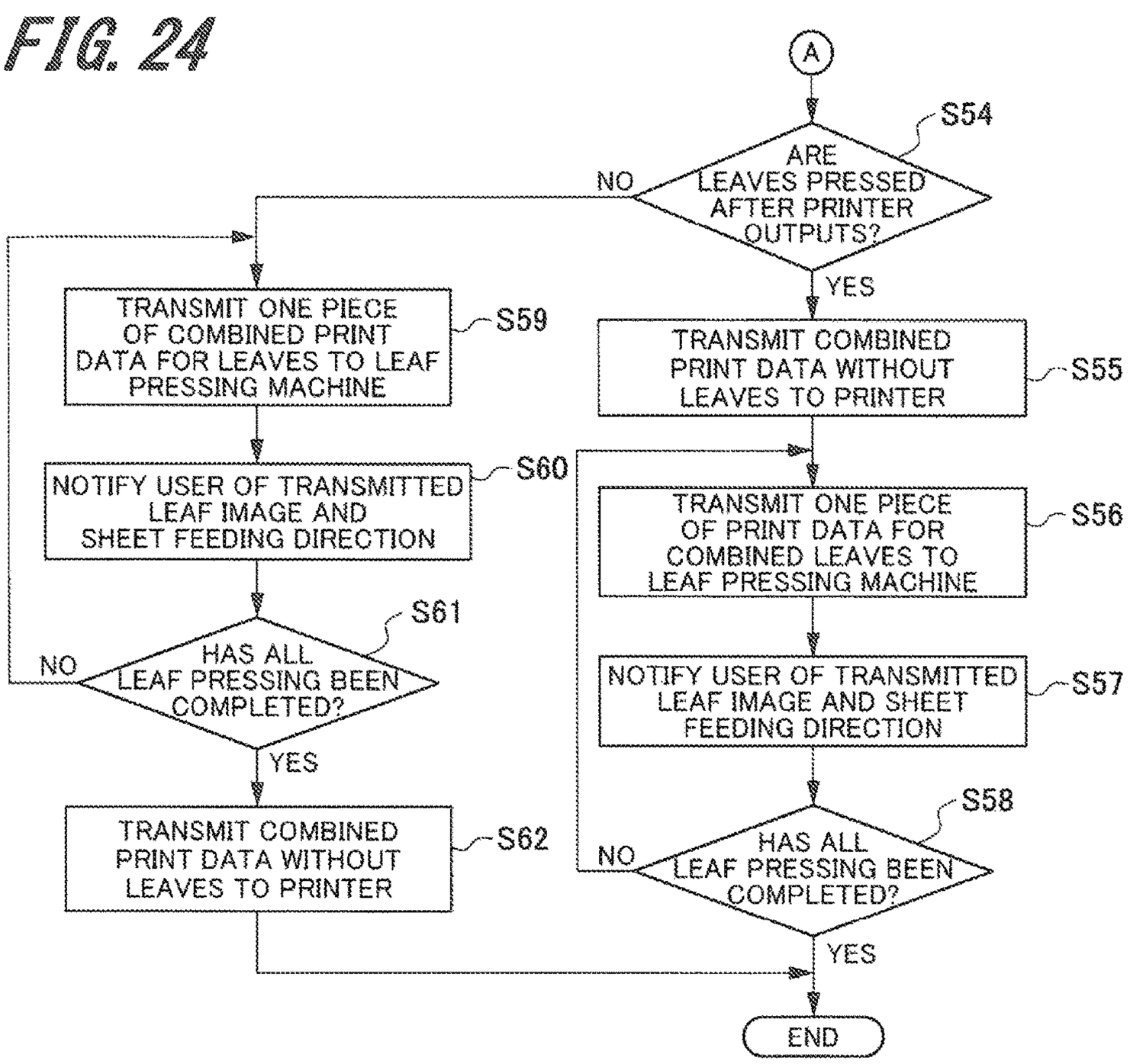
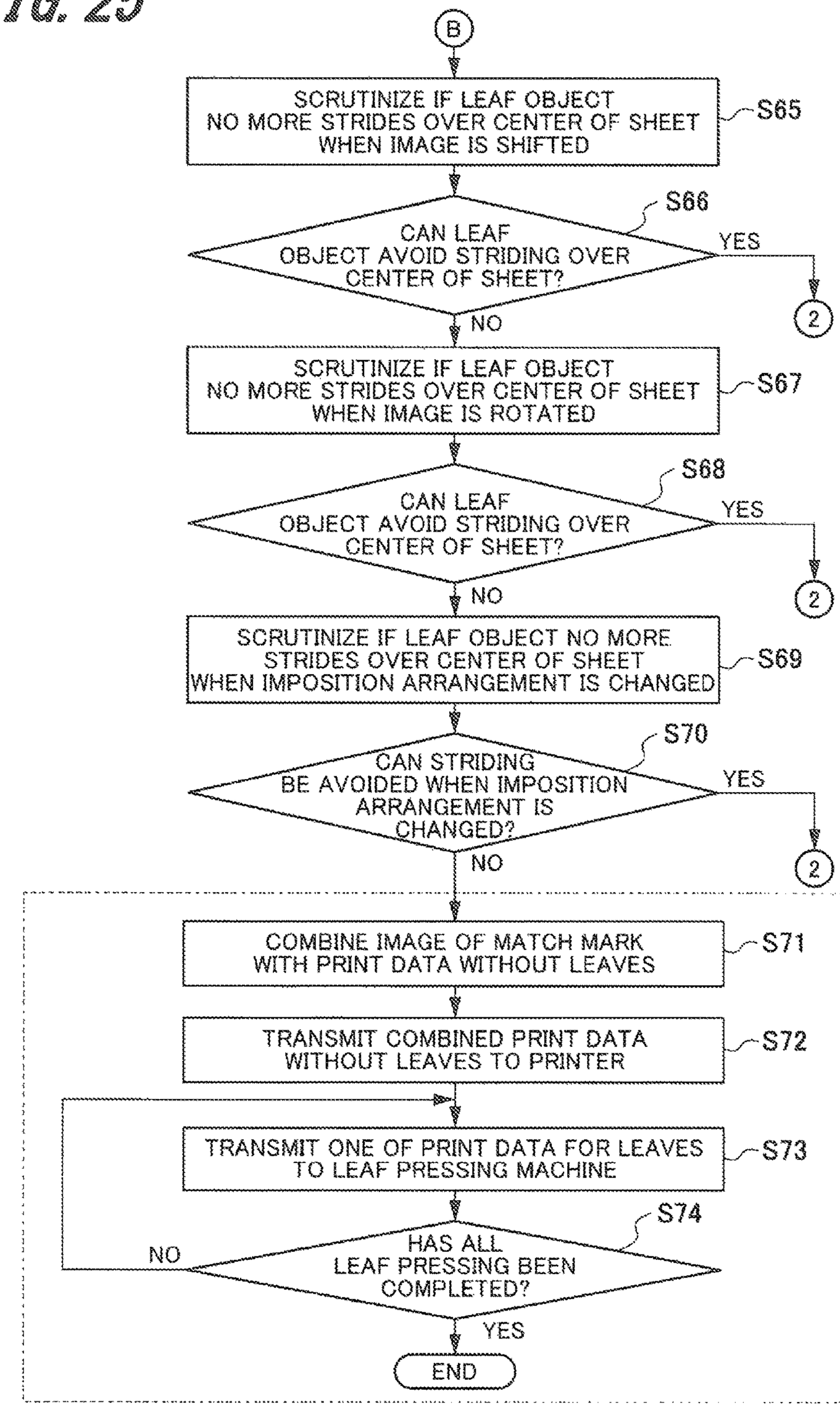

A
S54
ARE LEAVES PRESSED AFTER PRINTER OUTPUTS?
NO
YES
TRANSMIT ONE PIECE OF COMBINED PRINT DATA FOR LEAVES TO LEAF PRESSING MACHINE
S59
TRANSMIT COMBINED PRINT DATA WITHOUT LEAVES TO PRINTER
S55
NOTIFY USER OF TRANSMITTED LEAF IMAGE AND SHEET FEEDING DIRECTION
S60
TRANSMIT ONE PIECE OF PRINT DATA FOR COMBINED LEAVES TO LEAF PRESSING MACHINE
S56
S61
HAS ALL LEAF PRESSING BEEN COMPLETED?
NO
YES
NOTIFY USER OF TRANSMITTED LEAF IMAGE AND SHEET FEEDING DIRECTION
S57
TRANSMIT COMBINED PRINT DATA WITHOUT LEAVES TO PRINTER
S62
S58
HAS ALL LEAF PRESSING BEEN COMPLETED?
NO
YES
END

FIG. 25


B
SCRUTINIZE IF LEAF OBJECT NO MORE STRIDES OVER CENTER OF SHEET WHEN IMAGE IS SHIFTED
S65
CAN LEAF OBJECT AVOID STRIDING OVER CENTER OF SHEET?
S66
YES
NO
2
SCRUTINIZE IF LEAF OBJECT NO MORE STRIDES OVER CENTER OF SHEET WHEN IMAGE IS ROTATED
S67
CAN LEAF OBJECT AVOID STRIDING OVER CENTER OF SHEET?
S68
YES
NO
2
SCRUTINIZE IF LEAF OBJECT NO MORE STRIDES OVER CENTER OF SHEET WHEN IMPOSITION ARRANGEMENT IS CHANGED
S69
CAN STRIDING BE AVOIDED WHEN IMPOSITION ARRANGEMENT IS CHANGED?
S70
YES
NO
2
COMBINE IMAGE OF MATCH MARK WITH PRINT DATA WITHOUT LEAVES
S71
TRANSMIT COMBINED PRINT DATA WITHOUT LEAVES TO PRINTER
S72
TRANSMIT ONE OF PRINT DATA FOR LEAVES TO LEAF PRESSING MACHINE
S73
HAS ALL LEAF PRESSING BEEN COMPLETED?
S74
NO
YES
END

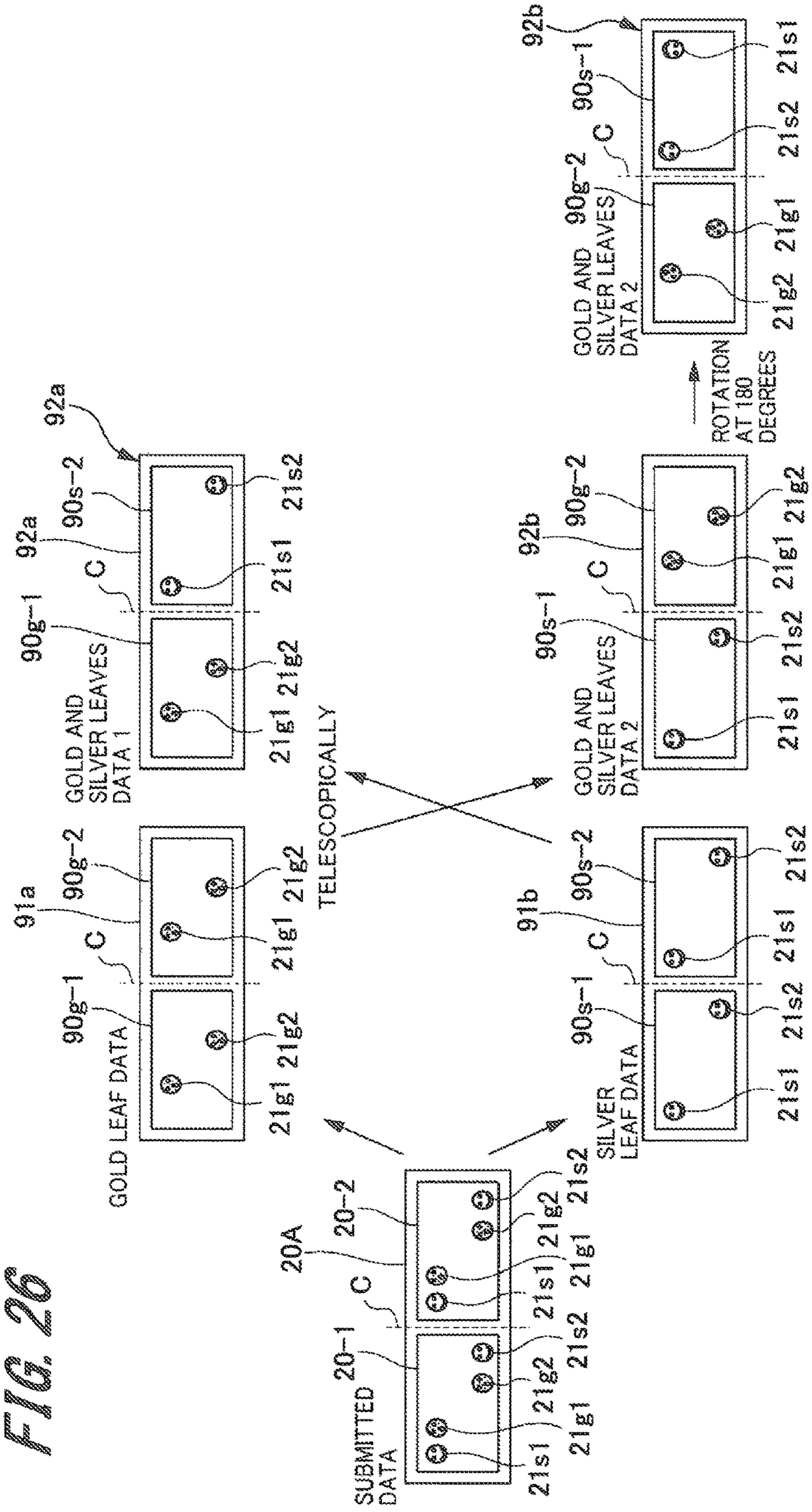

92a
90g–1
C
90s–2
GOLD AND SILVER LEAVES DATA 1
21g1 21g2
21s1 21s2
91a
90g–2
GOLD LEAF DATA
TELESCOPICALLY
92b
90s–1
GOLD AND SILVER LEAVES DATA 2
ROTATION AT 180 DEGREES
91b
SILVER LEAF DATA
20A
20–1
20–2
SUBMITTED DATA

FIG. 26

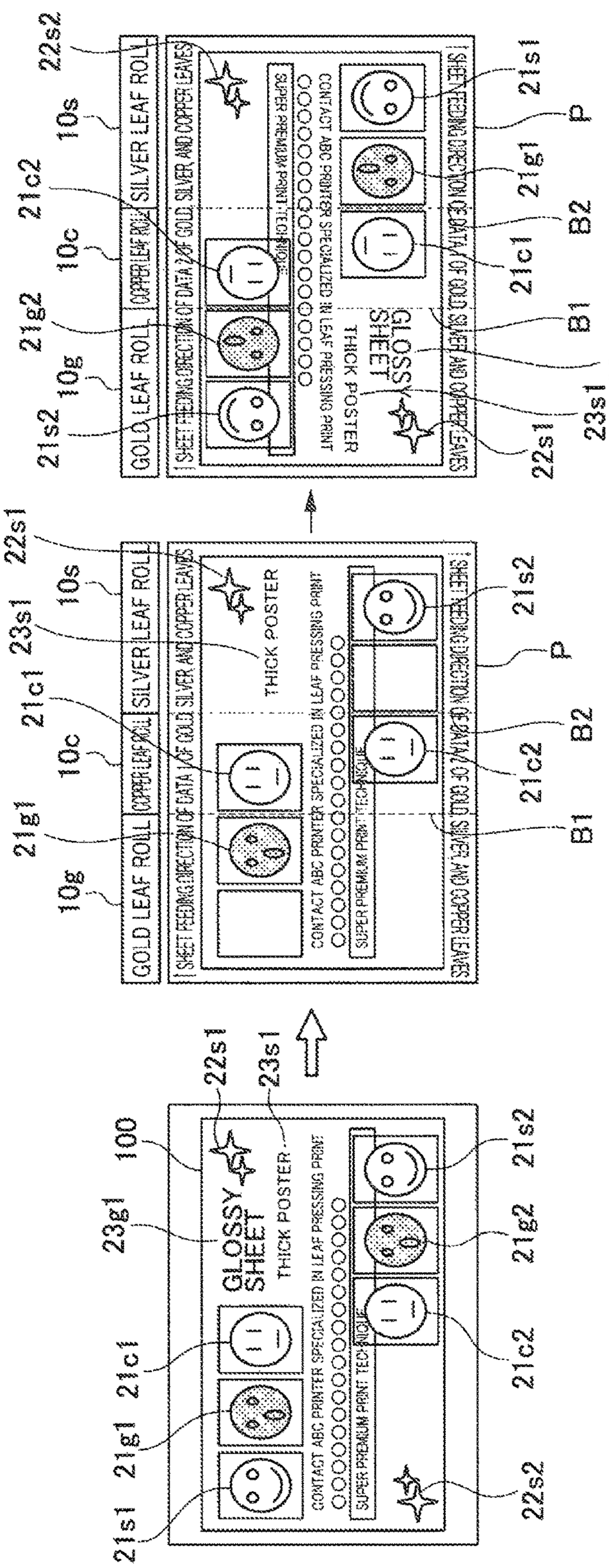
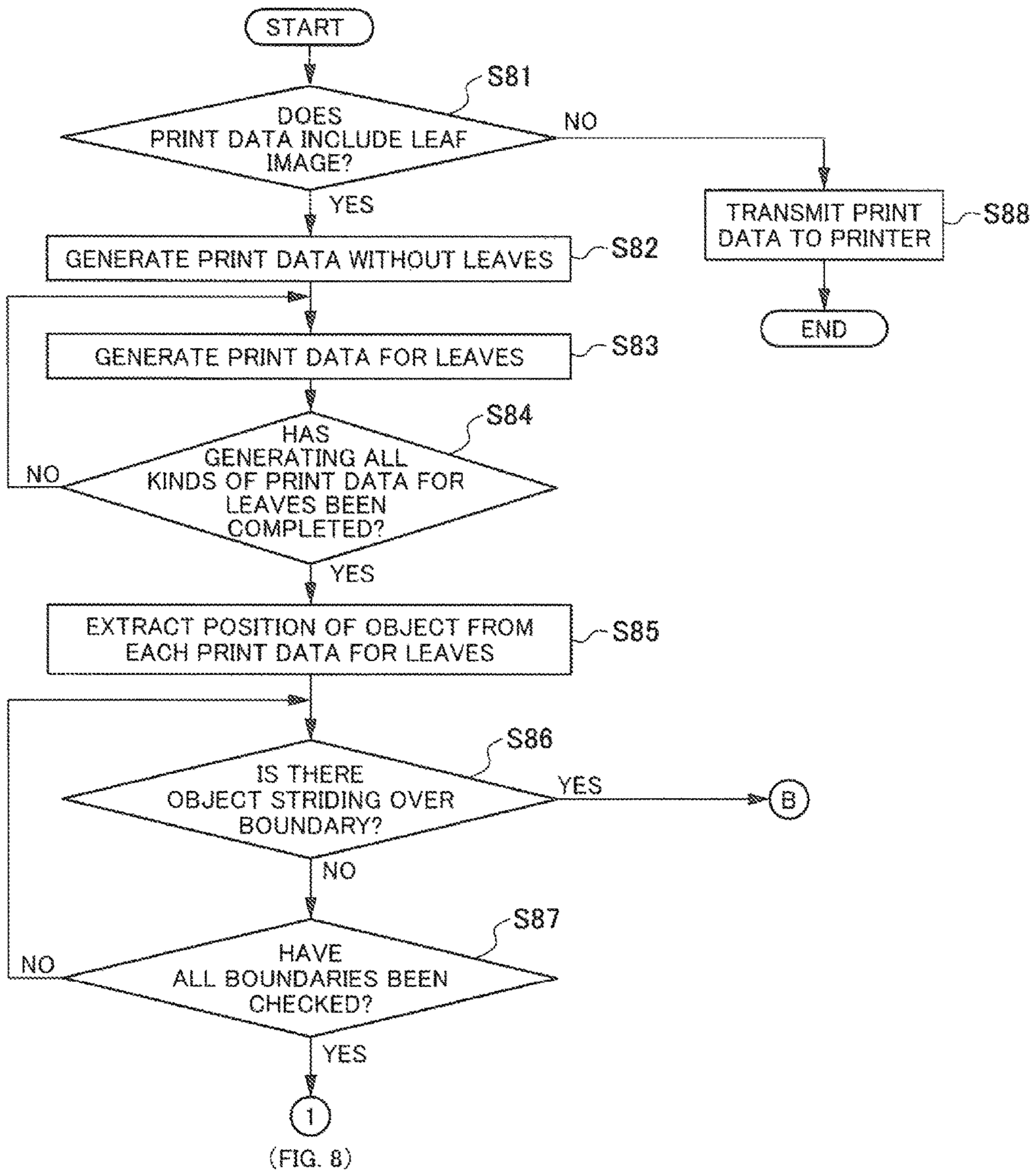

GOLD LEAF ROLL
COPPER LEAF ROLL
SILVER LEAF ROLL
SHEET FEEDING DIRECTION OF DATA
GOLD, SILVER AND COPPER LEAVES
CONTACT ABC PRINTER SPECIALIZED IN LEAF PRESSING PRINT
SUPER PREMIUM PRINT TECHNIQUE
GLOSSY SHEET
THICK POSTER
10g
10c
10s
21g1
21c1
21s1
22s1
23s1
21g2
21c2
21s2
22s2
23g1
B1
B2
P
100
(1)
(2)

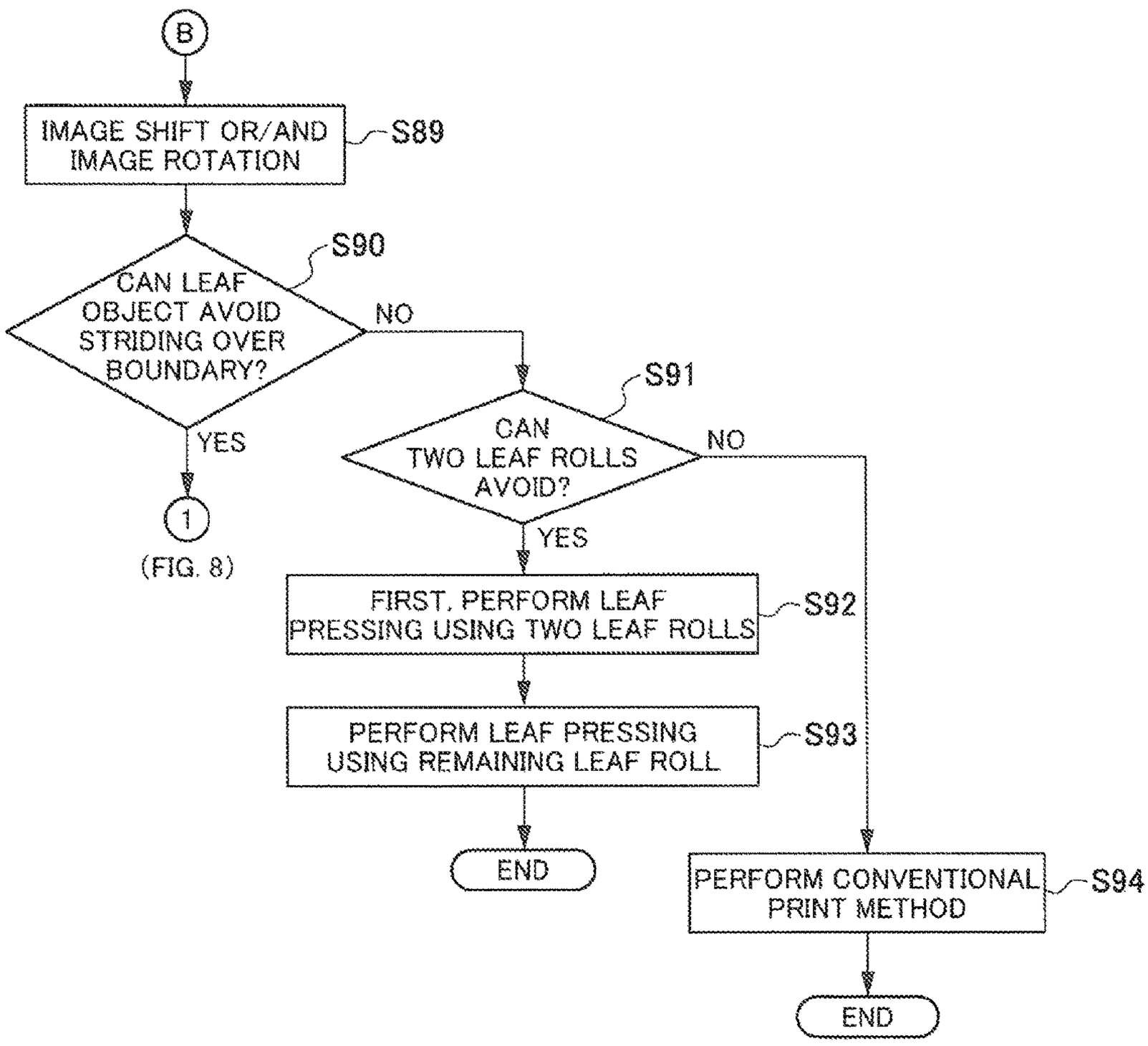
FIG. 27

FIG. 28


START
S81
DOES PRINT DATA INCLUDE LEAF IMAGE?
NO
YES
TRANSMIT PRINT DATA TO PRINTER
S88
END
GENERATE PRINT DATA WITHOUT LEAVES
S82
GENERATE PRINT DATA FOR LEAVES
S83
S84
HAS GENERATING ALL KINDS OF PRINT DATA FOR LEAVES BEEN COMPLETED?
NO
YES
EXTRACT POSITION OF OBJECT FROM EACH PRINT DATA FOR LEAVES
S85
S86
IS THERE OBJECT STRIDING OVER BOUNDARY?
YES
B
NO
S87
HAVE ALL BOUNDARIES BEEN CHECKED?
NO
YES
1

(FIG. 8)

FIG. 29


B
IMAGE SHIFT OR/AND IMAGE ROTATION
S89
CAN LEAF OBJECT AVOID STRIDING OVER BOUNDARY?
S90
NO
YES
1
(FIG. 8)
CAN TWO LEAF ROLLS AVOID?
S91
NO
YES
FIRST, PERFORM LEAF PRESSING USING TWO LEAF ROLLS
S92
PERFORM LEAF PRESSING USING REMAINING LEAF ROLL
S93
END
PERFORM CONVENTIONAL PRINT METHOD
S94
END

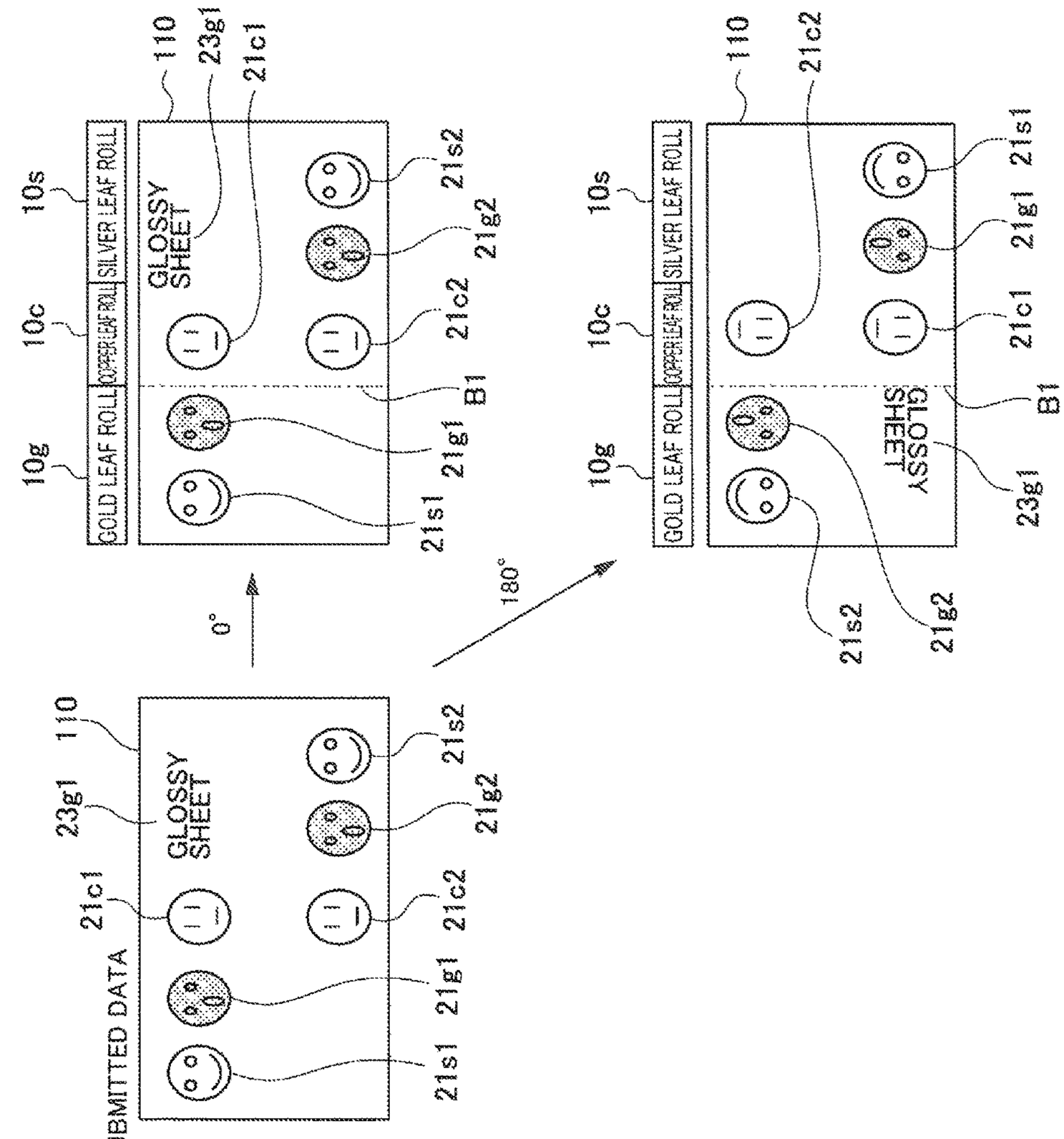

SUBMITTED DATA
110
23g1
GLOSSY SHEET
21c1
21c2
21g1
21g2
21s1
21s2
0°
180°
10s
SILVER LEAF ROLL
10c
COPPER LEAF ROLL
10g
GOLD LEAF ROLL
B1

FIG. 30

FIG. 31

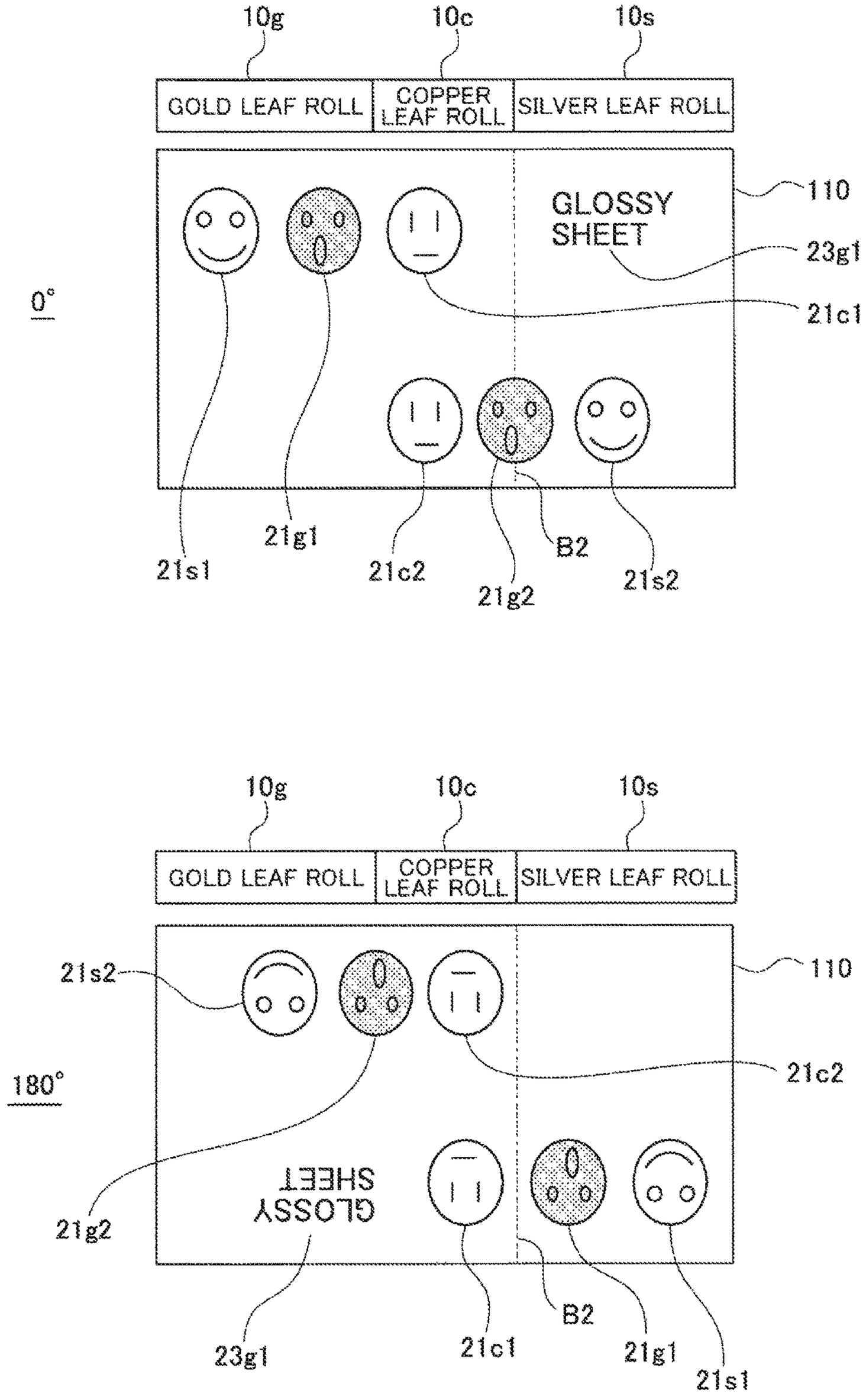

10g
10c
10s
GOLD LEAF ROLL
COPPER LEAF ROLL
SILVER LEAF ROLL
110
GLOSSY SHEET
23g1
21c1
0°
21s1
21g1
21c2
21g2
B2
21s2
10g
10c
10s
GOLD LEAF ROLL
COPPER LEAF ROLL
SILVER LEAF ROLL
21s2
110
21c2
180°
21g2
GLOSSY SHEET
B2
23g1
21c1
21g1
21s1

FIG. 32

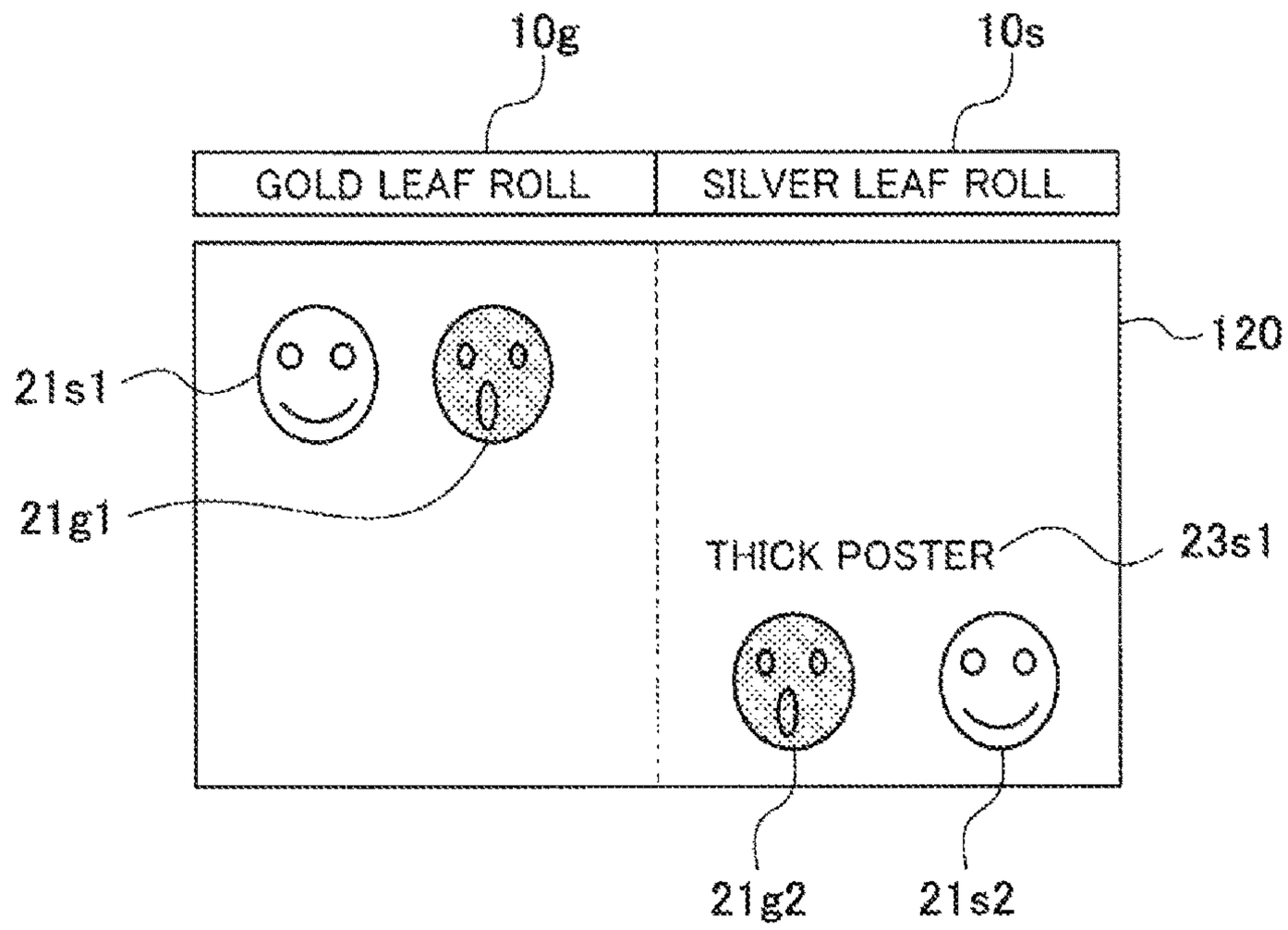
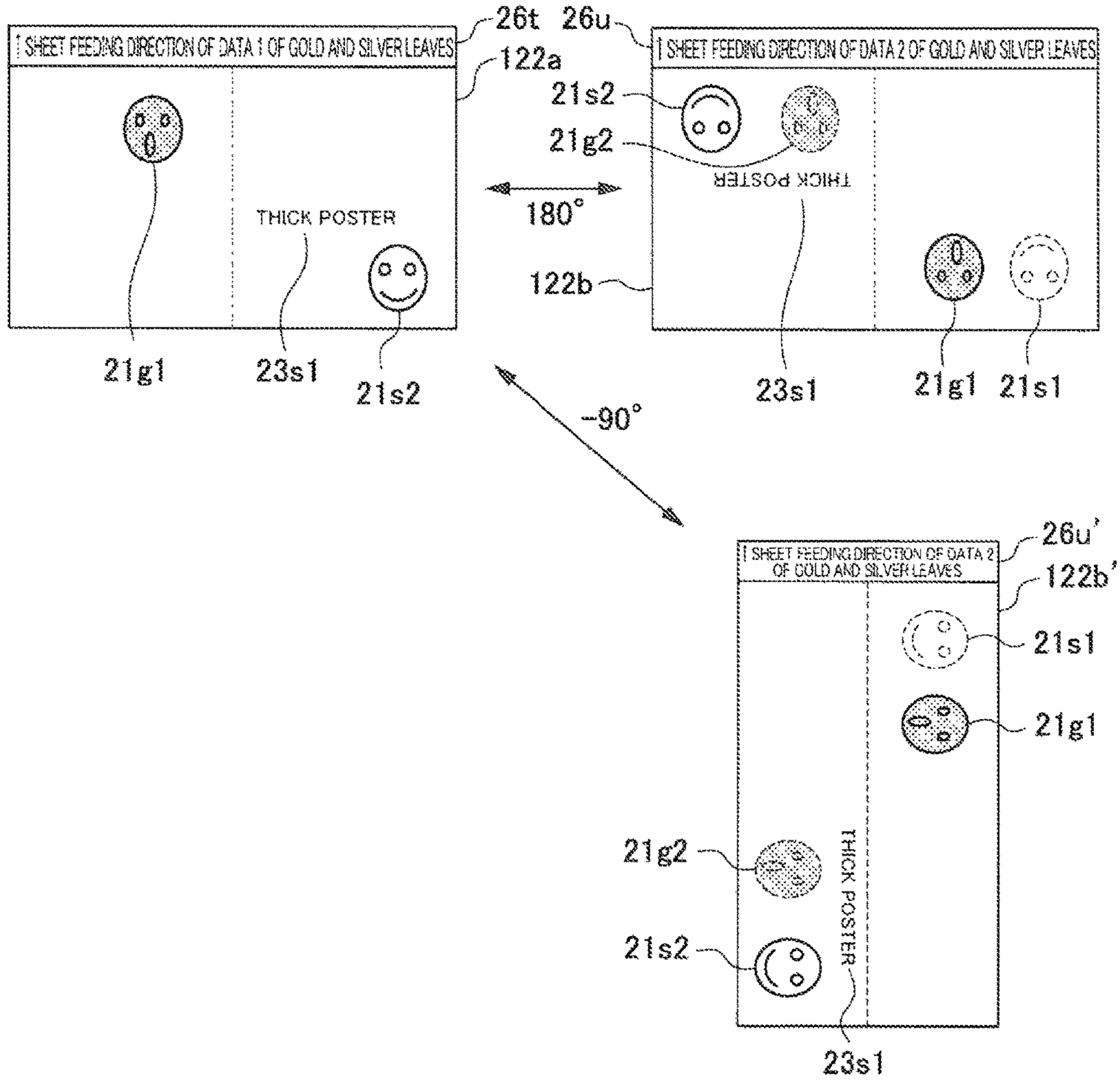

10g
10s
GOLD LEAF ROLL
SILVER LEAF ROLL
120
21s1
21g1
THICK POSTER
23s1
21g2
21s2

FIG. 33


SHEET FEEDING DIRECTION OF DATA 1 OF GOLD AND SILVER LEAVES
26t
26u
122a
21s2
21g2
SHEET FEEDING DIRECTION OF DATA 2 OF GOLD AND SILVER LEAVES
THICK POSTER
180°
THICK POSTER
122b
21g1
23s1
21s2
23s1
21g1
21s1
-90°
SHEET FEEDING DIRECTION OF DATA 2 OF GOLD AND SILVER LEAVES
26u'
122b'
21s1
21g1
21g2
21s2
THICK POSTER
23s1

INFORMATION PROCESSING EQUIPMENT AND COMPUTER-READABLE RECORDING MEDIUM FOR PRESSING MULTIPLE COLORS OF METAL LEAF

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to an information processing equipment and a computer-readable recording medium that generate print data for leaves for leaf pressing processing.

Description of the Related Art

Conventionally, leaf pressing print has been known for forming characters and designs made of leaves of gold, silver, and the like, on a sheet. Leaf pressing print is performed by applying adhesive material such as varnish on the sheet, and bonding a metal thin film (leaf) with a point where the adhesive material is applied.

Here, with reference to FIGS. **1** and **2**, a print system including a conventional leaf pressing machine will be described. FIG. **1** is a schematic view illustrating an entire construction of the print system including a conventional leaf pressing machine. FIG. **2** illustrates conventional leaf pressing print (when a leaf object does not stride over a boundary).

According to the conventional leaf pressing print, when print data (submitted data **5**) including a gold leaf image and a silver leaf image is submitted from a client terminal **1**, the submitted data **5** is divided by a controller **2** into three kinds of print data **6** without leaves excluding a gold or a silver leaf object (also referred to as a "leaf pressed image"), print data **7***g* for gold leaves including a gold leaf object, and print data **7***s* for silver leaves including a silver leaf object.

Subsequently, the print data **6** without leaves is printed by a printer **3**, and a user sets printed matter **8** in a leaf pressing machine **4**. Since only one kind of leaf pressing can be performed by a general leaf pressing machine **4**, a gold leaf roll is set in the leaf pressing machine **4** first, and the leaf pressing machine **4** performs additional print (leaf pressing) on the printed matter **8** based on the print data **7***g* for gold leaves. Subsequently, a silver color leaf roll is set in the leaf pressing machine **4**, and the leaf pressing machine **4** performs the additional print (leaf pressing) based on print data **7***s* for silver leaves to create printed matter **9** on which the gold leaf and the silver leaf are pressed.

Further, in recent years, a leaf pressing machine that can mount two leaf rolls has been developed. As illustrated in FIG. **2**, two leaf rolls in different colors are arranged adjacent to each other in a vertical direction with respect to a sheet forwarding direction. A boundary C is a boundary part between a gold leaf region **11***g* (one example of first region) where the leaf pressing processing is performed with a gold leaf roll **10***g* (first leaf roll), and a silver leaf region **11***s* (one example of second region) where the leaf pressing processing is performed with a silver leaf roll **10***s* (second leaf roll), and corresponds to a center of a leaf image **12** of the submitted data. Such a leaf pressing machine mounting two leaf rolls can press the gold leaf and the silver leaf at a time, if a leaf image **12** includes a gold leaf object **13***g* and a silver leaf object **13***s* that are located at a left side and a right side respectively holding the boundary C between the gold leaf object **13***g* and the silver leaf object **13***s* as illustrated in FIG. **2**.

Patent Literature 1 discloses constructions of a rotational drive section, a bearing device, a winding axis, and the like, to keep stopping a partial leaf roll that does not perform the leaf pressing, in a device provided with a partial leaf roll sending a partial leaf row obtained by dividing a transfer leaf into one or more.

RELATED ART DOCUMENT

Patent Document

Patent Literature 1: Japanese Laid-Open Patent Publication No. 2006-224667

SUMMARY OF THE INVENTION

Problem to be Solved by the Invention

FIG. **3** illustrates a conventional leaf pressing print (when the leaf object strides over the boundary). As illustrated in FIG. **3**, when a leaf image **14** includes a gold leaf objet **15***g* and a silver leaf object **15***s* striding over the boundary C, even the above-described leaf pressing machine mounting the two leaf rolls cannot complete the leaf pressing processing at a time. Therefore, the gold leaf roll and the silver leaf roll that are longer than the conventional leaf image **14** in a width direction (vertical direction with respect to the sheet forwarding direction) need to be prepared, and two-time leaf pressing print needs to be performed while the gold leaf roll and the silver leaf roll are replaced with each other.

FIG. **4** illustrates submitted data dotted with a plurality of different leaf objects. In the submitted data **20** illustrated in FIG. **4**, gold leaf objects (**21***g***1**, **21***g***2**, **23***g***1**), and silver leaf objects (**21***s***1**, **21***s***2**, **22***s***1**, **22***s***2**, **23***s***1**) are dotted right and left in an image. As illustrated in FIG. **4**, also when the gold and silver leaf objects are scattered all over a sheet, since the above-described method cannot complete the leaf pressing print at a time, the leaf pressing print needs to be performed two times while the gold leaf roll and the silver leaf roll are replaced with each other as the conventional method.

Technique disclosed in Patent Literature 1 also needs much work for pressing the leaves in a plurality of colors, and Patent Literature 1 does not disclose a method of solving a problem of the above-described leaf pressing machine mounting the plurality of leaf rolls.

The present invention is conducted in consideration of the above-described states, and has an object to provide the leaf pressing machine mounting the plurality of leaf rolls that can perform the leaf pressing print without replacing the leaf rolls, even when two or more leaf objects are dotted all over the image in the submitted data.

Means for Solving the Problem

An information processing equipment of an aspect of the present invention includes a stride-over determining section and a print data for combined leaves generating section. The stride-over determining section extracts leaf objects from first print data for leaves including a first leaf image including only a leaf object in a first color and second print data for leaves including a second leaf image including only a leaf object in a second color that are formed on a sheet by leaf pressing processing performed by a leaf pressing machine in which a first leaf roll in the first color and a second leaf roll in the second color are arranged adjacent to each other in a vertical direction with respect to a sheet forwarding direction, and determines whether or not there is a leaf object striding over a boundary between a first region where the leaf pressing processing is performed with the first

leaf roll and a second region where the leaf pressing processing is performed with the second leaf roll.

A print data for combined leaves generating section, when the stride-over determining section determines that there is no leaf object striding over the boundary, performs processing for dividing each of the first leaf image in the first print data for leaves and the second leaf image in the second print data for leaves at the boundary, and replacing one of divided leaf images with one of other divided leaf images that hold the boundary between the first leaf image and the second leaf image to generate a first combined-leaves image and a second combined-leaves image and also performs processing for rotating the second combined-leaves image at a predetermined angle, so as to generate first print data for combined leaves including the first combined-leaves image, and second print data for combined leaves including the second combined-leaves image after being rotated.

The problem, construction, and effect other than described above will be clarified by embodiments described below.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, advantages and features of the present invention will become more fully understood from the detailed description given hereinbelow and the appended drawings which are given by way of illustration only, and thus are not intended as a definition of the limits of the present invention, and wherein,

FIG. **1** is a schematic view illustrating an entire construction of a print system including a conventional leaf pressing machine;

FIG. **2** illustrates conventional leaf pressing print (when a leaf object does not stride over a boundary);

FIG. **3** illustrates the conventional leaf pressing print (when the leaf object strides over the boundary);

FIG. **4** illustrates submitted data dotted with a plurality of different leaf objects;

FIG. **5** is a schematic view illustrating an entire construction of the print system including the leaf pressing machine according to a first embodiment of the present invention;

FIG. **6** is a block diagram illustrating a hardware construction of each device included in the print system according to the first embodiment of the present invention;

FIG. **7** is a block diagram illustrating a functional construction of a submitted data processing section of a controller according to the first embodiment of the present invention;

FIG. **8** is a flowchart illustrating a process (**1**) of a submitted data processing method according to the first embodiment of the present invention;

FIG. **9** is a flowchart illustrating a process (**2**) of the submitted data processing method according to the first embodiment of the present invention;

FIG. **10** is a flowchart illustrating a process (**3**) of the submitted data processing method according to the first embodiment of the present invention;

FIG. **11** illustrates print data without a leaf image, print data for leaves in a first color, and print data for leaves in a second color generated from the submitted data;

FIG. **12** illustrates a method of determining whether there is a leaf object striding over the boundary, according to the first embodiment of the present invention;

FIG. **13** illustrates a method of creating first print data for leaves and second print data for leaves, according to the first embodiment of the present invention;

FIG. **14** illustrates processing for applying attached information to a cutting region of the print data without leaves, according to the first embodiment of the present invention;

FIG. **15** illustrates the leaf pressing processing according to the first embodiment of the present invention;

FIG. **16** illustrates image adjusting processing (image shift) according to the first embodiment of the present invention;

FIG. **17** illustrates image adjusting processing (image rotation) according to the first embodiment of the present invention;

FIG. **18** illustrates a method of determining whether there is a leaf object striding over the boundary when the boundary is not located at a center of a sheet according to a second embodiment of the present invention;

FIG. **19** illustrates an example of an image in submitted data in which page layout is set in multiple imposition;

FIG. **20** illustrates a case where imposition arrangement of images is changed according to a third embodiment of the present invention;

FIG. **21** illustrates a case where the image is moved in a vertical direction with respect to the boundary according to the third embodiment of the present invention;

FIG. **22** illustrates a case where the image is rotated according to the third embodiment of the present invention;

FIG. **23** is a flowchart illustrating a process (**1**) of a submitted data processing method according to the third embodiment of the present invention;

FIG. **24** is a flowchart illustrating a process (**2**) of the submitted data processing method according to the third embodiment of the present invention;

FIG. **25** is a flowchart illustrating a process (**3**) of the submitted data processing method according to the third embodiment of the present invention;

FIG. **26** illustrates a method of creating a first print data for leaves and a second print data for leaves from submitted data for multiple imposition according to the third embodiment of the present invention;

FIG. **27** illustrates an example of leaf pressing processing performed by a leaf pressing machine mounting three leaf rolls according to a fourth embodiment of the present invention;

FIG. **28** is a flowchart illustrating a process (**1**) of a submitted data processing method according to the fourth embodiment of the present invention;

FIG. **29** is a flowchart illustrating a process (**2**) of the submitted data processing method according to the fourth embodiment of the present invention;

FIG. **30** illustrates a method (**1**) for determining whether there is a leaf object striding over a boundary according to the fourth embodiment of the present invention;

FIG. **31** illustrates a method (**2**) for determining whether there is a leaf object striding over the boundary according to the fourth embodiment of the present invention;

FIG. **32** illustrates an example of a leaf image in submitted data according to a fifth embodiment of the present invention; and

FIG. **33** illustrates an example of a rotation angle of the leaf image included in print data for leaves according to the fifth embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter, an embodiment of the present invention will be described with reference to the drawings. However, the scope of the invention is not limited to the illustrated examples.

With reference to the attached drawings, embodiments for conducting the present invention will be described below. The embodiments will be described in order described below. Note that constituent elements having substantially the same functions or configurations in each figure are given the same reference numerals and duplicated explanation will be omitted.

1. First Embodiment (example in which divided leaf images of leaf images in different colors are replaced with each other)
2. Second Embodiment (example in which the boundary is not located at a center of a leaf sheet)
3. Third Embodiment (multiple imposition, arrangement change, shift, center rotation)
4. Fourth Embodiment (example in which the leaf pressing machine mounts three leaf rolls)
5. Fifth Embodiment (rotation angle of the leaf image in one of print data for leaves)
6. Others

<1. First Embodiment>

[Entire Construction of Print System]

FIG. **5** is a schematic view illustrating an entire construction of the print system including the leaf pressing machine according to the first embodiment.

A print system **40** illustrated in FIG. **5** includes a controller **50**, a printer **60**, and a leaf pressing machine **70**. The controller **50** (one example of information processing equipment), the printer **60**, and the leaf pressing machine **70** are connected with each other via a network N (FIG. **6**). The printer **60** has the similar function to that of the printer **3** illustrated in FIG. **1**. Further, as illustrated in FIGS. **2** and **3**, in the leaf pressing machine **70**, the gold leaf roll **10***g* and the silver leaf roll **10***s* are arranged adjacent to each other in a vertical direction with respect to a sheet forwarding direction.

The print data (submitted data **5**) including a gold leaf image and a silver leaf image included in a print job is submitted from the client terminal **1** to the controller **50**. The controller **50** generates print data **41** without leaves excluding the leaf image (leaf pressed image) that includes a gold leaf object and a silver leaf object, first print data **42***a* for combined leaves including the gold leaf object and the silver leaf object, and further second print data **42***b* for combined leaves including the gold leaf object and the silver leaf object, from the submitted data **5**. With reference to FIG. **13**, the first print data **42***a* for combined leaves and the second print data **42***b* for combined leaves will be described in detail below. The print data (submitted data) input in the present embodiment is image data without the leaf image or with the leaf image.

The print data **41** without leaves is input into the printer **60**, and the printer **60** performs the print processing based on the print data **6** without leaves. The user sets printed matter **43** in the leaf pressing machine **70**. The leaf pressing machine **70** performs additional print (leaf pressing) on the printed matter **43** for a first time, based on the first print data **42***a* for combined leaves. Subsequently, the user sets again in the leaf pressing machine **70** the printed matter **43** on which the leaf pressing machine **70** has performed the additional print for the first time. Then, the leaf pressing machine **70** performs the additional print (leaf print) on the printed matter **43** for a second time, based on the second print data **42***b* for combined leaves. By performing such processing, printed matter **44** on which the gold leaf and the silver leaf are pressed is created.

According to the embodiment described below, an environment in which each device of the print system **40** is connected with each other via the network N, is described as an example. However, the print data may be input into the printer **60** and the leaf pressing machine **70** using a recording medium such as a USB (universal serial bus) memory.

[Hardware Construction of Each Device]

FIG. **6** is a block diagram illustrating a hardware construction of each device included in the print system **40**.

A personal computer is adopted for the client terminal **1**, for example. Based on user's input operation, the client terminal **1** generates image data for performing print with a document creating or image creating application. Further, the client terminal **1** has a function of generating a print job that includes print setting information (also referred to as a "job ticket") and the image data (print data), and outputting them to the controller **50**. The print setting information includes information about presence or absence of leaf pressing print setting, page layout and the like.

(Controller)

As illustrated in FIG. **6**, the controller **50** includes a CPU **51**, a memory **52**, an auxiliary storage device **53**, a submitted data processing section **54**, a RIP processing section **55**, and a communication I/F **56** (one example of communication section). A personal computer or a server is adopted for the controller **50**, for example.

The controller **50** includes the CPU (Central Processing Unit) **51**, the memory **52** which is a volatile recording medium, and the auxiliary storage device **53** which is a non-volatile recording medium, which are connected with each other via a bus. Further, the controller **50** includes the submitted data processing section **54**, the RIP processing section **55**, and the communication I/F **56**.

The CPU **51** is a central processing unit that performs control and operation processing of actions of each section in the controller **50**. The CPU **51** reads from the auxiliary storage device **53** a program code of software for realizing each function according to the present embodiment, and performs the program code. Note that the controller **50** may include a processing unit such as an MPU (micro-processing unit) in place of the CPU **51**.

The memory **52** is a main storage device, and variables, parameters and the like generated during operation processing are temporarily written into the memory **52**. A RAM (random access memory) or the like is adopted for the memory **52**.

The auxiliary storage device **53** is a storage device having an auxiliary role of the memory **52**, and includes a system in which the data can be usually stored for long periods. As the auxiliary storage device **53**, an HDD (hard disk drive), an SSD (solid state drive), a flexible disk, an optical disk, an optical magnetic disk, a CD-ROM, a CD-R, magnetic tape, a non-volatile memory card, and the like, are used. The auxiliary storage device **53** records, in addition to an OS (operating system) and various kinds of parameters, a program for functioning the controller **50**. For example, the auxiliary storage device **53** may store a program (software) illustrated in FIGS. **8** to **10**.

The submitted data processing section **54** processes the print data (submitted data) submitted to the controller **50**. The submitted data processing section **54** generates the print data without leaves, the print data for leaves in each color from the submitted data and the like. The print data processed by the submitted data processing section **54** is supplied to RIP processing. The submitted data processing section **54** will be described in detail below.

The RIP processing section **55** reflects the print setting on the print data, converts the print data into a language (PDL; page description language) that can be recognized by the

printer **60**, and outputs it. The language that can be recognized by the printer **60** includes PCL, Post Script and the like. When the page layout setting is included, the RIP processing section **55** performs layout on the print data, based on the number of layouts and arrangement described in the page layout setting.

The communication I/F **56** uses an NIC or the like (network interface card), for example, is constructed to be able to transmit and receive various kinds of data among devices via the network N such as a LAN.

(Printer)

The printer **60** receives the print job output from the client terminal **1** via the network N, forms an image on a sheet, and outputs the image (hereinafter, referred to as "print processing"), based on the print setting and print data of the print job. The printer **60** may be an MFP (multi-function peripheral) having a plural kinds of functions (print function, copy function, scan function).

As illustrated in FIG. **6**, the printer **60** includes a CPU **61**, a memory **62**, an auxiliary storage device **63**, an operation display section **64**, an image forming section **65**, and a communication section I/F **66**.

The CPU **61** is a central processing unit that performs control and operation processing of actions of each section in the printer **60**. The CPU **61** reads from the auxiliary storage device **63** a program code of software for realizing each function according to the present embodiment, and performs the program code. Note that the printer **60** may include a processing unit such as the MPU in place of the CPU **61**.

The memory **62** is a main storage device, and variables and parameters generated during the operation processing are temporarily written into the memory **62**. The RAM or the like is adopted for the memory **62**.

The auxiliary storage device **63** is a storage device having an auxiliary role of the memory **62**, and includes a system usually being capable of storing the data for long periods. The auxiliary storage device **63** records, in addition to an OS and various kinds of parameters, a program for functioning the printer **60**.

The operation display section **64** is constructed by layering touch panels that is an operation section, on a flat panel display that is a display section. The operation display section **64** generates an operation signal corresponding to content of an operation input by the user, and supplies the generated operation signal to the CPU **61**. Further, the operation display section **64** displays a processing result of the CPU **61**.

The image forming section **65** forms an image on a sheet, based on print data (print data without leaves) transmitted from the controller **50**. The image forming section **65** is constructed as a printer engine.

The communication section I/F **66** uses the NIC or the like, for example, and is constructed to be able to transmit and receive various kinds of data among devices via the network N.

(Leaf Pressing Machine)

The leaf pressing machine **70** reads the print data for leaves in each color transmitted from the controller **50**, applies varnish at a position of a sheet corresponding to each pixel of the leaf image included in the print data for leaves and, then, the leaves are bonded (leaf pressed) on the varnish.

As illustrated in FIG. **6**, the leaf pressing machine **70** includes a CPU **71**, a memory **72**, an auxiliary storage device **73**, an operation display unit **74**, a sheet conveying section **75**, a first-leaf-pressing processing section **76**, a second-leaf-pressing processing section **77**, and a communication section I/F **78**.

The CPU **71** is a central processing unit that performs control and operation processing of action of each section in the leaf pressing machine **70**. The CPU **71** reads from the auxiliary storage device **73** a program code of software for realizing each function according to the present embodiment and performs the program code. Note that the leaf pressing machine **70** may include a processing unit such as the MPU in place of the CPU **71**.

The memory **72** is a main storage device, and variables and parameters generated during the operation processing are temporarily written into the memory **72**. The RAM or the like is adopted for the memory **72**.

The auxiliary storage device **73** is a storage device having an auxiliary role of the memory **72**, and includes a system usually being capable of storing the data for long periods. The auxiliary storage device **73** records, in addition to OS and various kinds of parameters, a program for functioning the leaf pressing machine **70**.

The operation display unit **74** is constructed by layering touch panels that are an operation section, on a flat panel display that is a display section. The operation display unit **74** generates an operation signal corresponding to content of an operation input by the user, and supplies the generated operation signal to the CPU **71**. Further, the operation display unit **74** displays a processing result of the CPU **71**.

The sheet conveying section **75** conveys a sheet set by the user in a manually feeding tray or a sheet-feeding tray of the leaf pressing machine **70** (both are not illustrated).

Based on the first print data for leaves including the gold leaf image (one example of a first leaf image) and the silver leaf image (one example of a second leaf image), the first-leaf-pressing processing section **76** applies the varnish on the sheet, and drives the gold leaf roll **10***g* to perform the leaf pressing so as to bond the gold leaf on the varnish.

Based on the second print data for leaves including the gold leaf image (one example of the first leaf image) and the silver leaf image (one example of the second leaf image), the second-leaf-pressing processing section **77** applies the varnish on the sheet, and drives the silver leaf roll **10***s* to perform the leaf pressing so as to bond the silver leaf on the varnish.

The communication section I/F **78** uses the NIC or the like, for example, and is constructed to be able to transmit and receive various kinds of data among devices via the network N.

[Control System of Controller]

Subsequently, a functional construction of the submitted data processing section **54** in the controller **50** will be described. FIG. **7** is a block diagram illustrating a functional construction of the submitted data processing section in the controller **50**.

The submitted data processing section **54** includes an input processing section **540**, a submitted data holding section **541**, an analysis processing section **542**, a print data without leaves generating section **543**, a print data for leaves generating section **544**, a stride-over determining section **545**, a print data for combined leaves generating section **546**, an image adjusting section **547**, an attached-information-image combining section **548**, and an output processing section **549**.

The input processing section **540** receives input of a print job including print setting information and print data, and supplies the print job to the submitted data holding section **541**.

The submitted data holding section **541** temporarily holds the print job received by the input processing section **540**.

The analysis processing section **542** reads the print job held by the submitted data holding section **541**, and analyzes the print setting information included in the print job. When the print setting information includes leaf pressing print setting, the analysis processing section **542** determines that the submitted print data includes a leaf image. Alternatively, each pixel of the print data is scanned, and the analysis processing section **542** determines based on its result. When the submitted print data does not include the leaf image, the analysis processing section **542** supplies the print data to the output processing section as it is.

The print data without leaves generating section **543** generates print data without leaves excluding the gold leaf image and the silver leaf image from the submitted print data, and outputs the generated print data without leaves to the attached-information-image combining section **548**.

The print data for leaves generating section **544** extracts first print data **25**G for leaves (refer to FIG. **11**) including the gold leaf image and second print data **25**S for leaves (refer to FIG. **11**) including the silver leaf image, from the submitted print data. Subsequently, the print data for leaves generating section **544** converts the extracted first print data **25**G for leaves and the second print data **42***b* for combined leaves into data in a format that can be read by the leaf pressing machine **70**, for example, a TIFF format (tagged image file format). The print data for leaves in the TIFF format includes information about coordinates of each pixel included in the print data for leaves and information about a pixel value of each pixel.

Note that, processing performed by the print data without leaves generating section **543** and the print data for leaves generating section **544** may be performed by the analysis processing section **542**.

The stride-over determining section **545** extracts the leaf object from the first print data **25**G for leaves and the second print data **25**S for leaves that are generated by the print data for leaves generating section **544**. Then, the stride-over determining section **545** determines whether or not there is a leaf object striding over a boundary between a gold leaf region **11***g* (first region) where leaf pressing processing is performed with the gold leaf roll **10***g* and a silver leaf region **11***s* (second region) where the leaf pressing processing is performed with the silver leaf roll **10***s*. Then, when there is no leaf object striding over the boundary (OK), the stride-over determining section **545** informs the print data for combined leaves generating section **546** of OK. When there is a leaf object striding over the boundary (NG), the stride-over determining section **545** informs the image adjusting section **547** of NG.

When the stride-over determining section **545** determines that there is no leaf object striding over the boundary, the print data for combined leaves generating section **546** performs processing for generating print data for combined leaves. The print data for combined leaves generating section **546** includes a dividing/replacing section **546***a* and an image rotating section **546***b*.

The dividing/replacing section **546***a* divides each of the gold image in the first print data **25**G for leaves and the silver image in the second print data **25**S for leaves. Subsequently, the dividing/replacing section **546***a* replaces one of the divided leaf images with one of other divided leaf images that hold the boundary between the gold leaf image and the silver leaf image to generate a first combined-leaves image and a second combined-leaves image. The image rotating section **546***b* rotates the second combined-leaves image generated by the dividing/replacing section **546***a* at a predetermined angle.

As described above, the print data for combined leaves generating section **546** generates the first print data **42***a* for combined leaves including the first combined-leaves image and the second print data **42***b* for combined leaves including the second combined-leaves image after being rotated. The print data for combined leaves generating section **546** supplies the generated first print data **42***a* for combined leaves and the generated second print data **42***b* for combined leaves to the output processing section **549**.

When the stride-over determining section **545** determines that there is the leaf object striding over the boundary, the image adjusting section **547** performs image processing for changing positions of the first print data **25**G for leaves (gold leaf image) and the second print data **25**S for leaves (silver leaf image) so that the leaf object striding over the boundary no more strides over the boundary. The image adjusting section **547** includes an image shift section **547***a* and an image rotating section **547***b*.

The image shift section **547***a* performs image processing for moving (entire image including) the gold leaf image and the silver leaf image in a vertical direction with respect to the boundary. Note that the image shift section **547***a* may perform the image processing for moving the image in the submitted data before the leaf image is extracted.

The image rotating section **547***b* performs the image processing for rotating (entire image including) the gold leaf image and the silver leaf image. After the gold leaf image and the silver leaf image are moved in the vertical direction with respect to the boundary by the image shift section **547***a* and the image rotating section **547***b*, continuously the image processing for rotating the gold leaf image and the silver leaf image may be performed. Note that the image rotating section **547***b* may perform the image processing for moving the image in the submitted data before the leaf image is extracted.

According to the present embodiment, the image adjusting section **547** changes the position of the image in the print data in the submitted data holding section **541** before the print data for leaves generating section **544** generates the print data for leaves in each color, and then returns the image whose position has been changed to the submitted data holding section **541**. However, the present invention is not limited to the embodiment. The position of the leaf image in the print data for leaves in each color output from the print data for leaves generating section **544** may be individually changed.

At this point, when the leaf object striding over the boundary still strides over the boundary even if the image adjusting section **547** performs the image adjustment, the print data for leaves generating section **544** supplies the first print data **25**G for leaves and the second print data **25**S for leaves in the print data for combined leaves to the output processing section **549**. Further, the stride-over determining section **545** notifies the attached-information-image combining section **548** and the print data for leaves generating section **544** of the problem in which the leaf object still strides over the boundary even after the image has been adjusted (NG).

The attached-information-image combining section **548** applies a positioning image (match mark image M), (refer to FIG. **14** described below), as attached information when the leaf pressing processing is performed by the leaf pressing machine **70**, in a region corresponding to a cutting region **26***t* or **26***u* at a leading end side of the a sheet in a sheet feeding

direction in the printing data without leaf. The cutting region **26***t* and **26***u* have a width having a predetermined distance from an end portion of the sheet in the sheet feeding direction, and are cut after the image is formed on the sheet. At this point, a positioning image is applied at a position (i.e., cutting region) corresponding to a sheet feeding direction when each leaf pressing processing is performed with the first print data **42***a* for combined leaves and the second print data **42***b* for combined leaves.

Further, the attached-information-image combining section **548** applies information indicating the sheet feeding direction and a sheet feeding order of the sheet to correspond to an order of each leaf pressing processing of the first print data **42***a* for combined leaves and the second print data **42***b* for combined leaves in a region corresponding to the cutting region at the leading end side of the sheet in the sheet feeding direction in the print data without leaves.

The output processing section **549** outputs the print data supplied from the analysis processing section **542**, the print data without leaves obtained by combining the attached information images by the attached-information-image combining section **548**, the print data for combined leaves generated by the print data for combined leaves generating section **546**, or the print data for leaves generated by the print data for leaves generating section **544**. The output processing section **549** supplies the data described above to the RIP processing section **55**.

[Process of Submitted Data Processing Method]

Subsequently, the submitted data processing method according to the first embodiment will be described.

FIG. **8** is a flowchart illustrating a process (**1**) of a submitted data processing method. FIG. **9** is a flowchart illustrating a process (**2**) of a submitted data processing method. Further, FIG. **10** is a flowchart illustrating a process (**3**) of a submitted data processing method. With reference to FIGS. **11** to **17**, the flowcharts illustrated in FIGS. **8** to **10** will be described. As a condition, submitted data **20** illustrated in FIG. **4** is to include the gold and silver leaf images, and further, the boundary is to correspond to a center line that divides the sheet into two in a width direction that is vertical with respect to the sheet forwarding direction.

First, when the print job is input into the controller **50** from the client terminal **1** via the communication I/F **56**, the input processing section **540** temporarily holds the print job in the submitted data holding section **541**. Note that, although an example of the print data submitted to the print job is described, the print data not included in the print job may be applied.

Next, the analysis processing section **542** determines whether or not there is a leaf image in the print data, included in the print job (S**1**). Methods of checking if there is the leaf image in the print data includes a method of referring to the print setting information and scanning the print data for each pixel.

When, in step S**1**, there is no leaf image in the print data included in the print job (NO in S**1**), the analysis processing section **542** outputs the print data to the printer **60** as it is (S**21**). When the step S**21** is completed, the submitted data processing is ended.

Next, when, in step S**1**, the analysis processing section **542** determines that there is a leaf image in the submitted print data (YES in S**1**), the print data without leaves generating section **543** receives the determination result and the print data from the analysis processing section **542** to generate the print data without leaves from the submitted print data (S**2**).

Next, the print data for leaves generating section **544** generates the first print data for leaves including the gold leaf image and the second print data for leaves including the silver leaf image from the submitted print data (S**3**).

FIG. **11** illustrates an example of the print data without leaves, the first print data for leaves, and the second print data for leaves that are generated from the submitted data **20**. By the processing in step S**2**, print data **25**N without leaves excluding the gold leaf and silver leaf objects is generated. Further, by the processing in step S**3**, the first print data **25**G for leaves including only the gold objects (**21***g***1**, **21***g***2**, **23***g***1**) are generated. The second print data **25**S for leaves including only silver objects (**21***s***1**, **21***s***2**, **22***s***1**, **22***s***2**, **23***s***1**) are generated.

The explanation returns to FIG. **8**. After the processing in step S**3**, the print data for leaves generating section **544** determines whether or not generating the print data for leaves including all kinds of leaf images has been completed (S**4**). When there is the print data for leaves including the leaf image to be generated (NO in S**4**), the print data for leaves generating section **544** returns to step S**3** to generate the print data for leaves including the corresponding leaf image.

When, in step S**4**, the print data for leaves generating section **544** determines that generating the print data for leaves including all kinds of leaf images (in this example, gold leaf image and silver leaf image) has been completed (YES in S**4**), the stride-over determining section **545** extracts a position of the leaf object from each print data for leaves (S**5**).

Next, as illustrated in FIG. **12**, the stride-over determining section **545** determines whether or not there is a leaf object striding over a center of a sheet (boundary C) in the extracted leaf object (S**6**).

FIG. **12** illustrates a method of determining whether there is a leaf object striding over the boundary, according to the first embodiment.

In the first print data **25**G for leaves, any of the gold leaf objects (**21***g***1**, **21***g***2**, **23***g***1**) does not stride over the boundary C. In a similar manner, in the second print data **25**S for leaves, none of the silver leaf objects (**21***s***1**, **21***s***2**, **22***s***1**, **22***s***2**, **23***s***1**) strides over the boundary C.

(Case when there is Leaf Object Striding Over Boundary)

The explanation returns to FIG. **8**. Next, when there is no leaf object striding over the center of the sheet (boundary C) in the leaf image in the print data for leaves (NO in S**6**), the stride-over determining section **545** proceeds to processing in step S**7**. On the other hand, when there is a leaf object striding over the center of the sheet, the image shit or/and image rotation is performed not to stride over the center of the sheet as described below. The image shift or/and image rotation will be described below.

Then, the dividing/replacing section **546***a* of the print data for combined leaves generating section **546** divides each of the gold leaf image in the first print data **25**G for leaves and the silver leaf image in the second print data **25**S for leaves at the center of the sheet (boundary C) (S**7**).

Then, the dividing/replacing section **546***a* telescopically combines one of the divided leaf image with one of other divided leaf images that hold the boundary C between the gold leaf image (first print data **25**G for leaves) and the silver leaf image (second print data **25**S for leaves) to generate two kinds of combined leaf images (print data for combined leaves) (S**8**).

Then, the image rotating section **546***b* in the print data for combined leaves generating section **546** rotates one of the combined leaf images telescopically combined by the divid-

ing/replacing section **546***a* at a predetermined angle (180 degrees in this example) (S**9**).

FIG. **13** illustrates a method of creating the first print data **25**G for leaves and the second print data **25**S for leaves according to the first embodiment.

A divided leaf image **25***g*L on the left side of the gold leaf image and a divided leaf image **25***s*R on the right side of the silver leaf image are combined with each other to generate the first combined-leaves image (first print data **42***a* for combined leaves). In a similar manner, the divided leaf image **25***g*R on the right side of the gold leaf image and the divided leaf image **25***s*L on the left side of the silver leaf image are combined with each other to generate the second combined-leaves image (second print data **42***b* for combined leaves). Subsequently, the image rotating section **546***b* rotates the second combined-leaves image (second print data **42***b* for combined leaves) at 180 degrees. The processing is performed to rotate the second combined-leaves at 180 degrees to be combined with each other, so that the gold leaf image is imposed on the left side and the silver leaf image is imposed on the right side. With this arrangement, generating the print data for combined leaves including the gold leaf object and the silver leaf object is completed.

The explanation returns to FIG. **8**. Then, the attached-information-image combining section **548** applies positioning image (match mark image M) (refer to FIG. **14** described below) as the attached information (S**10**), when the leaf pressing processing is performed by the leaf pressing machine **70** in a region corresponding to the cutting region **26***t* or **26***u* at the leading end side of the sheet in the sheet feeding direction in the print data without leaves. The match mark image M is not limited to a two-dimensional bar code, but may be an arbitrary image such as a cross.

Then, the attached-information-image combining section **548** applies information indicating the sheet feeding direction and the sheet feeding order to correspond to the order of each leaf pressing processing of the first print data **42***a* for combined leaves and the second print data **42***b* for combined leaves in the region corresponding to the cutting region **26***t* or **26***u* at the leading end side of the sheet in the sheet feeding direction in the print data without leaves (S**11**).

FIG. **14** illustrates processing for applying the attached information to the cutting region of the print data **25**N without leaves according to the first embodiment.

The match mark image M is a positioning mark or the like (figure, symbol, two-dimensional bar code or the like), to be printed in margin such as the cutting region **26***t*, **26***u* of the sheet, so that the leaf image and the leaf pressing position are not misaligned, and is printed at a leading end in the sheet feeding direction. According to the present embodiment, after the leaf is once pressed, in order to rotate the sheet at 180 degrees without replacing the leaf rolls and press the leaves again, the match mark image M rotated at 180 degrees, information D**2** indicating the sheet feeding direction/sheet feeding order, and "the sheet feeding direction of the gold and silver leaves data **2** " are applied in the cutting region **26***u* of the image in the print data **25**N without leaves.

Next, the output processing section **549** outputs the combined print data **26** without leaves, in which the match mark image M and the image of the information indicating the sheet feeding direction/sheet feeding order are combined with each other. The controller **50** transmits the combined print data **26** without leaves (FIG. **14**) to the printer **60**. Print processing by the printer **60** and leaf pressing print by the leaf pressing machine **70** will be described below.

The explanation returns to FIG. **8**. After the processing in step S**11** illustrated in FIG. **8** is ended, the CPU **51** of the controller **50** determines whether or not, after the printer **60** performs the print processing, the leaf pressing machine **70** is set to perform the leaf pressing processing (S**12** in FIG. **9**).

When it is determined that the leaf pressing machine **70** is set to perform the leaf pressing processing after the printer **60** performs the print processing in step S**12** (YES in S**12**), the CPU **51** transmits the combined print data **26** without leaves to the printer **60** (S**13**).

Then, the CPU **51** transmits one of the combined print data for leaves (e.g., first print data **42***a* for combined leaves) to the leaf pressing machine **70** (S**14**). At this point, the CPU **51** displays the leaf image of the transmitted first print data **42***a* for combined leaves and the sheet feeding direction on a screen of the operation display unit **74**, and notifies the user of them (S**15**).

Then, the CPU **51** determines whether or not the leaf pressing has been completed on all leaf images (print data for combined leaves) (S**16**). When the leaf pressing has not been completed on some leaf images (NO in S**16**), the processing returns to step S**14** to transmit the next print data for combined leaves (e.g., second print data **42***b* for combined leaves) to the leaf pressing machine **70**.

When, in step S**16**, it is determined that the leaf pressing has been completed on the all leaf images (first and second print data for combined leaves) (YES in S**16**), the CPU **51** ends the submitted data processing.

On the other hand, when the leaf pressing machine **70** performs the leaf pressing processing first in step S**12** (NO in S**12**), the CPU **51** transmits the first print data **42***a* for combined leaves to the leaf pressing machine **70** (S**17**). Then, the CPU **51** performs the processing in steps S**18** and S**19**. The processing in steps S**18** and S**19** is the same as that in steps S**15** and S**16**.

Then, when it is determined that the leaf pressing has been completed on the all leaf images (first and second print data for combined leaves) in step S**19** (YES in S**19**), the CPU **51** transmits the combined print data **26** without leaves to the printer **60** (S**20**). When the processing in step S**20** is ended, the CPU **51** ends the submitted data processing.

FIG. **15** illustrates the leaf pressing processing according to the first embodiment.

The first print data **42***a* for combined leaves ("data **1** of gold and silver leaves" illustrated in FIG. **15**) obtained by combining the gold leaf image and the silver leaf image is first transmitted to the leaf pressing machine **70**, and the leaf pressing print (leaf pressing for the first time) of the first print data **42***a* for combined leaves is notified to the user. As a notification method, it can be considered to display information on the operation display unit **74** of the leaf pressing machine **70**, or display on a display device connected to the controller **50**.

Then, when the leaf pressing is completed on the first print data **42***a* for combined leaves (data **1** of gold and silver leaves), the second print data **42***b* for combined leaves (data **2** of gold and silver leaves) is transmitted to the leaf pressing machine **70**, and it is notified to the user to rotate the sheet at 180 degrees to set it (leaf pressing for the second time). With this arrangement, the printed matter with leaves **44** formed with all gold leaf image and silver leaf image can be obtained without any mistake in the order and the sheet feeding direction of leaf pressing in the leaf pressing for both the first time and the second time.

Note that notification of the leaf pressing print (rotation of the sheet at 180 degrees) of the first print data **42***a* for combined leaves or the second print data **42***b* for combined leaves described above is not essential. However, if the user is notified, mistakes drastically decreased in the number of

times of leaf pressing by the leaf pressing machine **70** and the direction of the sheet can be expected.

By the above-described submitted data processing according to the first embodiment, in the leaf pressing machine mounting the plurality of leaf rolls, even when two or more kinds of leaf objects are dotted all over the image in the submitted data, two or more kinds of the leaf pressing print can be performed without replacing the leaf rolls.

(Case when there is Leaf Object Striding Over Boundary)

Next, the explanation returns to FIG. **8**, and processing will be described when there is a leaf object striding over the center (boundary C) of the sheet included in the print data for leaves.

In step S**6**, when there is a leaf object striding over the center (boundary C) of the sheet in the leaf image in the print data for leaves (YES in S**6**), the stride-over determining section **545** proceeds to processing in step S**22** illustrated in FIG. **10**.

Then, the stride-over determining section **545** performs image processing for moving (entire image including) the gold leaf image and the silver leaf image in the vertical direction with respect to the center (boundary C) of the sheet by the image adjusting section **547** to scrutinize whether the leaf object no more strides over the center (boundary C) of the sheet (S**22**).

FIG. **16** illustrates image adjusting processing (image shift) according to the first embodiment. In the image **27** located on the left side in FIG. **16**, a silver leaf object **21***s***3** is located over the boundary C, and a center line Ci and the boundary C of the image **27** correspond to each other. In a moved image **28** on the right side, the silver leaf object **21***s***3** avoids striding over the boundary C, and the center line Ci and the boundary C of the image **28** do not correspond to each other. When there is a leaf object striding over the center (boundary C) of the sheet, the image is shifted up to a position where there is no more leaf object striding over the center of the sheet. A direction of shift is determined by comparing a right region and a left region from the boundary, and the image is to be shifted in a direction having smaller shift.

The explanation returns to FIG. **8**. The stride-over determining section **545** determines whether or not the leaf object can avoid striding over the center of the sheet by the image shift (S**23**). Here, when the leaf object can avoid striding over the center of the sheet (YES in S**23**), the processing proceeds to step S**7**, and dividing and telescopically combining are performed on each leaf image in each print data for leaves after the image is adjusted. On the other hand, when the leaf object cannot avoid striding over the center of the sheet (NO in S**23**), the processing proceeds to step S**24**.

Then, the stride-over determining section **545** performs the image processing for rotating (entire image including) the gold leaf image and the silver leaf image by the image adjusting section **547** to scrutinize whether the leaf object no more strides over the center (boundary C) of the sheet (S**24**).

FIG. **17** illustrates the image adjusting processing (image rotation) according to the first embodiment.

In a similar manner to FIG. **16**, in the image **27** located on the left side in FIG. **17**, the silver leaf object **21***s***3** is located over the boundary C. When there is such a leaf object striding over the center of the sheet, the image is rotated up to a position where there is no more leaf object striding over the center of the image **29**. In this example, although the image is rotated at the angle of θ degrees around a center point Cr of the image, the rotation center may be arbitrary.

Here, if the image is positioned obliquely, the sheet needs to have larger size than that of an original document, and thus the image is rotated at an angle for minimizing the size of the imposition sheet. The method also includes a method of combining the image shift and the image rotation described above to rotate the sheet at the angle for minimizing the size of the sheet. Note that, in consideration of economic efficiency of the leaf roll, the shorter the length of the sheet in the sheet forwarding direction is, the better the leaf roll is.

The explanation returns to FIG. **8**. The stride-over determining section **545** determines whether or not the leaf object can avoid striding over the center of the sheet by the image rotation (S**25**). Here, when the leaf object can avoid striding over the center of the sheet (YES in S**25**), the processing proceeds to step S**7** to perform dividing, telescopically combining and the like. On the other hand, when the leaf object cannot avoid striding over the center of the sheet (NO in S**25**), the CPU **51** proceeds to step S**26** to perform the conventional print method (S**26** to S**29**).

In the conventional print method, the attached-information-image combining section **548** first combines the match mark image with the print data without leaves (S**26**). Subsequently, the CPU **51** transmits the combined print data without leaves to the printer **60** (S**27**). Then, the CPU **51** transmits one of the print data without leaves (e.g., first print data **42***a* for combined leaves) to the leaf pressing machine **70** (S**28**).

Next, the CPU **51** determines whether or not the leaf pressing has been completed on the all leaf images (print data for combined leaves) (S**29**). When there is some leaf images on which the leaf pressing has not been completed (NO in S**29**), the processing returns to step S**28**, and the CPU **51** transmits the next print data for combined leaves (e.g., second print data **42***b* for combined leaves) to the leaf pressing machine **70**.

When it is determined that the leaf pressing has been completed on the all leaf images (first and second print data for combined leaves) in step S**29** (YES in S**29**), the CPU **51** ends the submitted data processing.

<2. Second Embodiment>

Next, a method of determining whether there is a leaf object striding over the boundary when the boundary is not located at the center of the sheet according to the second embodiment, will be described below.

FIG. **18** illustrates a method of determining whether there is a leaf object striding over the boundary when the boundary is not located at the center of the sheet according to the second embodiment.

An example of the first print data **25**G for leaves including the gold leaf image will be described. In the left figure in FIG. **18**, a boundary C**1** of the plurality of leaf rolls is misaligned to a left side with respect to the center C of the gold leaf image rotated at 0 degrees. In the right figure in FIG. **18**, each leaf object of the gold leaf image inverted at 180 degrees does not stride over the boundary C**1**. Therefore, it is determined that no leaf object included in the first print data **25**G for leaves strides over the boundary. In a similar manner, it is also determined whether there is a leaf object striding over the boundary in the second print data **25**S for leaves including the silver image.

<3. Third Embodiment>

Next, the processing of submitted data in which the page layout is set in multiple imposition according to the third embodiment, will be described.

FIG. **19** illustrates an example of an image in submitted data in which page layout is set in the multiple imposition. In print data **80** formed on a sheet P, nine images **81** are laid out in one page. The gold leaf objects **21***g***1** included in three

images **81** arranged longitudinally at the center of the sheet stride over the boundary C. As described above, when there is a leaf object striding over the center of the image in the multiple imposition or ganging where print having different kinds of setting is set in one page, a position of imposition and orientation of each image are changed so that no leaf object strides over the center of the sheet.

FIG. **20** illustrates a case where imposition arrangement of the image is changed according to the third embodiment.

Print data **80**A formed on the sheet P includes twelve images **81***r* (corresponding to a state where the image **81** arranged laterally in FIG. **19** is rotated at 90 degrees to be arranged longitudinally) (longitudinally 3×laterally 4) arranged in a longitudinal direction and laid out in one page. The boundary C is located between the image **81***r* in a second row and the image **81***r* in a third row, and the gold leaf object **21***g***1** avoids striding over the boundary.

FIG. **21** illustrates a case where the image is moved in a vertical direction with respect to the boundary according to the third embodiment. Print data **80**B illustrated in FIG. **21** is obtained by shifting the images **81** arranged in a right row and a center row in the print data **80** illustrated in FIG. **19**, into a right direction. With this arrangement, the boundary C is located between the gold leaf objects **21***g***1** and silver leaf objects **21***s***1**, and thus the leaf objects can avoid striding over the boundary.

FIG. **22** illustrates a case where the image is rotated according to the third embodiment. Print data **80**C illustrated in FIG. **22** is obtained by rotating the images **81** arranged in the center row in the print data **80** illustrated in FIG. **19**, and being set in imposition as the image **81***r*. With this arrangement, the gold leaf object **21***g***1** and the silver leaf object **21***s***1** of the image **81***r* located at the center are located at the right side to the boundary C, so that the leaf object avoids striding over the boundary.

[Process of Submitted Data Processing Method in Multiple Imposition]

Next, submitted data processing on submitted data in multiple imposition will be described.

FIG. **23** is a flowchart illustrating a process (**1**) of a submitted data processing method according to the third embodiment. FIG. **24** is a flowchart illustrating a process (**2**) of the submitted data processing method according to the third embodiment. Further, FIG. **25** is a flowchart illustrating a process (**3**) of the submitted data processing method according to the third embodiment. Portions in FIGS. **23** to **25** different from those in FIGS. **8** to **10** will be mainly described. Note that, as the condition, in a similar manner to FIGS. **8** to **10**, submitted data is to include the gold and silver leaf images, and the boundary is to correspond to the center line that divides the sheet into two in a width direction that is vertical with respect to the sheet forwarding direction. However, the present invention is not limited to the condition described above.

When the print job is first input to the controller **50**, the input processing section **540** temporarily holds the print job in the submitted data holding section **541**. Then, the analysis processing section **542** determines whether the print setting of the print data is set in the multiple imposition (S**41**). When it is not set in the multiple imposition (NO in S**41**), the processing is performed to proceed to step S**1** in the flowchart including no multiple imposition illustrated in FIG. **8** (S**63**). Methods of checking whether the print data is set in the multiple imposition, include those, where print setting information is referred to, or the print data is scanned for each pixel.

On the other hand, when the analysis processing section **542** determines that the print setting of the print data is set in the multiple imposition (YES in S**41**), the processing in step S**42** to step S**45** is performed to generate the print data without leaves, the first print data for leaves, and the second print data for leaves. The processing in step S**43** to step S**45** is the same as that of step S**1** to step S**4** in FIG. **8**.

Then, when the print data for leaves generating section **544** determines that generating the print data for leaves of all kinds of leaf images (in this example, the gold leaf image and the silver leaf image) has been completed in step S**45** (YES in S**45**), the print data for leaves generated in step S**44** is set in the multiple imposition based on the print setting information (S**46**).

Then, the stride-over determining section **545** extracts the position of the leaf object from each print data set in the multiple imposition (S**47**).

Then, the stride-over determining section **545** determines whether or not there is a leaf object striding over the center (boundary C) of the sheet in the extracted leaf object (S**48**).

(Case when there is Leaf Object Striding Over Boundary)

The explanation returns to FIG. **23**. Next, when there is no leaf object striding over the center (boundary C) of the sheet included in the print data for leaves set in the multiple imposition (NO in S**48**), the stride-over determining section **545** proceeds to processing in step S**49**. On the other hand, when there is a leaf object striding over the center of the sheet, the imposition arrangement is changed, and the image shift or the image rotation is performed so that the leaf object does not stride over the center of the sheet.

Then, processing in step S**49** to step S**53** is performed. The processing in step S**43** to step S**45** is the same as that in step S**7** to step S**11** in FIG. **8**.

Then, after the processing in step S**53** is ended, the processing in step S**54** to step S**62** in FIG. **24** is performed. The print processing of the print data without leaves and the leaf pressing processing of print data of two kinds of leaves are performed. The processing in step S**54** to step S**62** is the same as that in step S**12** to step S**20** in FIG. **8**. When the processing in step S**62** is ended, the CPU **51** ends the submitted data processing.

By the above-described submitted data processing, even when two or more kinds of leaf objects are dotted in the leaf image set in the multiple imposition all over the image in the submitted data, the leaf pressing machine mounting the plurality of leaf rolls can perform the leaf pressing print of two or more kinds of leaves without replacing the leaf rolls.

(Case when there is Leaf Object Striding Over Boundary)

Next, the explanation returns to FIG. **23**, and the processing when there is a leaf object striding over the center (boundary C) of the sheet included in the print data for leaves that is set in the multiple imposition, will be described.

When there is a leaf object striding over the center (boundary C) of the sheet in the leaf image in the print data for leaves in step S**48** (YES in S**48**), the stride-over determining section **545** proceeds to processing in step S**65** in FIG. **25**.

Then, the stride-over determining section **545** performs scrutiny and determination processing on the leaf object striding over the center of the sheet after the image is shifted (S**65**, S**66**). Then, the stride-over determining section **545** performs scrutiny and determination processing on the leaf object striding over the center of the sheet after the image is rotated (S**67**, S**68**). The processing in step S**65** to step S**68** is the same as that in step S**22** to step S**25** in FIG. **8**.

Then, the stride-over determining section **545** performs the image processing for changing imposition arrangement of (entire image including) the gold leaf image and the silver leaf image by the image adjusting section **547** to scrutinize whether the leaf object no more strides over the center (boundary C) of the sheet (S**69**).

Then, the stride-over determining section **545** determines whether or not the leaf object can avoid striding over the center of the sheet by changing the imposition arrangement (S**70**). When the leaf object can avoid striding over the center of the sheet (YES in S**70**), the processing proceeds to step S**49**, and the dividing, the telescopically combination and the like are performed on each leaf image of each print data for leaves after the image is adjusted.

On the other hand, when the leaf object cannot avoid striding over the center of the sheet (NO in S**70**), the processing proceeds to step S**71**, and the conventional print method is performed (S**71** to S**74**). The processing in step S**71** to step S**74** is the same as that in step S**26** to step S**29** illustrated in FIG. **8**. When it is determined that the leaf pressing of the all leaf image (first and second print data for combined leaves) has been completed in step S**74** (YES in S**74**), the CPU **51** ends the submitted data processing.

[Creating Processing of Print Data for Leaves in Multiple Imposition]

FIG. **26** illustrates a method of creating the first print data for combined leaves and the second print data for combined leaves from submitted data in multiple imposition according the third embodiment.

Print data for two pages, print data **20-1** and print data **20-2**, are laid out for right and left portions of one page, in the submitted data **20**A. Respective leaf objects of the print data **20-1** and the print data **20-2** do not stride over the center (boundary C) of the sheet.

Print data **91***a* for leaves for the gold leaf (gold leaf data: first print data for leaves) and print data **91***b* for leaves for the silver leaf (silver leaf data: second print data for leaves) are first generated from the submitted data **20**A. In print data **91***a* for leaves for the gold leaf, two gold leaf images **90***g*-**1** and **90***g*-**2** each including only gold leaf objects are set in imposition. In print data **91***b* for leaves for the silver leaf, two silver leaf images **90***s*-**1** and **90***s*-**2** each including only silver leaf objects are set in imposition.

Then, the right-side divided leaf image (gold leaf image **90***g*-**2**) of the divided leaf images (gold leaf images **90***g*-**1** and **90***g*-**2**) in the print data **91***a* for leaves for the gold leaf is replaced with the right-side divided leaf image (silver leaf image **90***s*-**2**) of the divided leaf images (silver leaf images **90***s*-**1** and **90***s*-**2**) in the print data **91***b* for leaves for the silver leaf (to combine telescopically) to create first print data **92***a* (data **1** of gold and silver leaves) for combined leaves in which the gold leaf image **90***g*-**1** and the silver leaf image **90***s*-**2** have been set imposition, and second print data **92***b* (data **2** of gold and silver leaves) for combined leaves in which the silver leaf image **90***s*-**1** and the gold leaf image **90***g*-**2** have been set in imposition. Finally, the second print data **92***b* for combined leaves is rotated at 180 degrees.

As understood from FIG. **26**, even in the submitted data including the images set in the multiple imposition, the leaf object can avoid striding over the boundary. Even when two or more kinds of leaf objects are dotted allover the image in the submitted data, the leaf pressing print can be performed without replacing the leaf rolls.

<4. Fourth Embodiment>

Next, as the fourth embodiment, an example in a case where the leaf pressing machine mounts three leaf rolls, will be described.

FIG. **27** illustrates an example of leaf pressing processing performed by a leaf pressing machine mounting three leaf rolls according to the fourth embodiment.

As illustrated in FIG. **27**, the leaf pressing machine mounts the gold leaf roll **10***g*, the silver leaf roll **10***s*, and a copper leaf roll **10***c*. An image **100** in the print data to be leaf-pressed includes gold leaf objects (**21***g***1**, **21***g***2**, **23***g***1**), silver leaf objects (**21***s***1**, **21***s***2**, **22***s***1**, **22***s***2**, **23***s***1**), and copper leaf objects (**21***c***1**, **21***c***2**).

The leaf objects in the image **100** stride over none of boundaries B**1** and B**2** located among the above-described three leaf rolls. Therefore, as illustrated in FIG. **27** (**1**), by the leaf pressing processing for the first time, the gold leaf object **21***g***1**, the silver leaf objects (**21***s***2**, **22***s***1**, **23***s***1**), and the copper leaf objects (**21***c***1**, **21***c***2**) are leaf-pressed. Subsequently, as illustrated in FIG. **27** (**2**), by the leaf pressing processing for the second time, rest of gold leaf objects (**21***g***2**, **23***g***1**), the silver leaf objects (**21***s***1**, **22***s***2**, **23***s***1**), and the copper leaf objects (**21***c***1**, **21***c***2**) are leaf-pressed.

According to the present embodiment, even when three leaf rolls are used, if there is no leaf object striding over the boundary, two-time leaf pressing processing can complete the print. When three or more leaf rolls are necessary, there are two or more boundaries among the leaf rolls. Thus, it is necessary for all boundaries to check if there is an object striding over every boundary.

[Process of Submitted Data Processing Method]

Next, the submitted data processing when the leaf pressing machine mounts three leaf rolls, will be described.

FIG. **28** is a flowchart illustrating a process (**1**) of a submitted data processing method according to the fourth embodiment. FIG. **29** is a flowchart illustrating a process (**2**) of the submitted data processing method according to the fourth embodiment.

When the print job is first input to the controller **50**, the input processing section **540** temporarily holds the print job in the submitted data holding section **541**. Next, the controller **50** performs processing in step S**81** to step S**85**, and step S**88**. The processing performed in step S**81** to step S**85**, and step S**88** is the same as that in step S**1** to step S**5**, and step S**21** illustrated in FIG. **8**.

Then, after the processing is performed in step S**5**, the stride-over determining section **545** determines whether or not there is a leaf object striding over the boundary B**1** in the extracted leaf object (S**86**).

FIG. **30** illustrates a method (**1**) for determining whether there is a leaf object striding over a boundary according to the fourth embodiment.

The leaf image **110** in the submitted data is obtained by simplifying component of the leaf image in the image **100** in FIG. **27**. First, the stride-over determining section **545** checks if there is a leaf object striding over the boundary B**1**. The leaf object is first checked in a state where the leaf image **110** is not rotated (0 degrees), and subsequently in a state where the leaf image **110** is rotated (180 degrees). When three leaf rolls are used, each boundary among the leaf rolls is not located at the center of the sheet. Thus, when the print data for combined leaves is generated by the submitted data processing of the present invention, check of processing in a normal state and in an inverted state is essential. In the example of FIG. **30**, there is no leaf object striding over the boundary B**1**.

Then, when there is no leaf object striding over the boundary B**1** in the leaf image in the print data for leaves (NO in S**86**), the stride-over determining section **545** determines for all boundaries whether or not it has been checked if there is a leaf object striding over every boundary (S**87**).

When the check has not been completed on all boundaries, or it has not been completed on some boundaries (NO in S**87**), the stride-over determining section **545** proceeds to step S**86**, and determines whether or not there is a leaf object striding over the next boundary B**2** in the extracted leaf objects.

FIG. **31** illustrates a method (**2**) for determining whether there is a leaf object striding over the boundary according to the fourth embodiment.

In a similar manner to a case of the boundary B**1**, the stride-over determining section **545** checks first if there is a leaf object striding over the boundary B**2** in a state where the leaf image **110** is not rotated (0 degrees). Subsequently, the stride-over determining section **545** checks it in a state where the leaf image **110** is rotated (180 degrees). In the example in FIG. **31**, the gold leaf object **21***g***2** strides over the boundary B**2** in a state where the leaf image **110** is not rotated (0 degrees). In this case, the image shift or/and image rotation described below is performed on the leaf image **110**.

Subsequently, when it is determined whether or not it has been checked on all boundaries if there is a leaf object striding over every boundary in step S**87** again, and when the check has been completed on all boundaries (YES in S**87**), the processing proceeds to step S**7** in FIG. **8** to perform dividing, telescopically combining, and the like.

On the other hand, in step S**86**, when there is a leaf object striding over the boundary in the leaf image in the print data for leaves (YES in S**86**), the stride-over determining section **545** proceeds to processing in step S**89** in FIG. **29**.

Next, the print data for combined leaves generating section **546** performs the image shift or/and the image rotation so that the leaf object does not stride over the boundary (S**89**). The processing is the same as that in step S**22** and step S**24**.

Then, the stride-over determining section **545** determines whether or not a leaf object can avoid striding over the leaf object by performing the image shift or/and the image rotation (S**90**). Here, when the leaf object can avoid striding over the boundary (YES in S**90**), the processing proceeds to step S**7** in FIG. **8**.

On the other hand, when the leaf object cannot avoid striding the boundary (NO in S**90**), it is determined whether the leaf object can avoid striding over the boundary using two leaf rolls (S**91**). Here, when the leaf object can avoid striding over the boundary using two leaf rolls (YES in S**91**), the print data for combined leaves generating section **546** generates the print data for combined leaves corresponding to the two leaf rolls, and outputs it to the output processing section **549**. Further, the attached-information-image combining section **548** combines the image of attached information with the print data without leaves. Then, the print data without leaves and the print data for combined leaves including the corresponding leaves are transmitted from the controller **50** to the printer **60** and the leaf pressing machine **70** to perform the print processing and leaf pressing (S**92**).

Subsequently, the print data for combined leaves generating section **546** performs the leaf pressing using the above-described two leaf rolls and, then, generates the print data for combined leaves for the rest of the leaf. Then, the leaf pressing machine **70** performs the leaf pressing using the rest of the leaf roll (S**93**).

On the other hand, when the stride-over determining section **545** determines that the leaf object cannot avoid striding over the boundary even if using the two leaf rolls in step **91** (NO in S**91**), the CPU **51** performs the conventional print method (S**94**). When the processing in step S**93** or step S**94** is finished, the submitted data processing is ended.

As described above, when the leaf pressing is performed using three or more kinds of leaves, three or more leaf rolls are first set in the leaf pressing machine **70**, and it is scrutinized whether the leaf pressing can be performed at a time. Then, when the leaf pressing cannot be performed at a time, the imposition and the order of the leaf pressing are controlled to replace the leaf rolls a minimum number of times.

<5. Fifth Embodiment>

According to the above-described embodiment, when two of the print data for leaves are generated, the image in one of the print data for leaves is rotated at 180 degrees. Here an example of rotation at an angle other than 180 degrees will be described.

FIG. **32** illustrates an example of a leaf image in the submitted data according to the fifth embodiment.

The submitted data **120** includes the gold leaf object **21***g***1** and the silver leaf object **21***s***1** on the left side of the center (dotted line portion) of the image, and the gold leaf object **21***g***2** and the silver leaf object **21***s***2**, **23***s***1** on the right side of the center of the image. The gold leaf roll **10***g* and the silver leaf roll **10***s* are set in the leaf pressing machine **70**.

FIG. **33** illustrates an example of a rotation angle of the leaf image included in the print data for leaves according to the fifth embodiment.

As illustrated in FIG. **33**, first combination and second combination can be considered out of the submitted data **120**. The first combination includes the first print data **122***a* for combined leaves and the second print data **122***b* for leaves, and the second combination includes the first print data **122***a* for combined leaves and the second print data **122***b*' for leaves. In the first combination, the second print data **122***b* for leaves is rotated at 180 degrees. On the other hand, in the second combination, the second print data **122***b*' for leaves is rotated at 90 degrees (−90 degrees). In the second combination, the leaf image in the second print data **122***b*' for leaves is longitudinally long and, thus, information of "↑sheet feeding direction of data **2** of gold and silver leaves" is formed on the cutting region **26***u*' provided in a lateral direction of the leaf image. Even in the above-described construction, since the leaf object does not stride over the center of the sheet, the leaf pressing processing of the present invention can be applied.

<6. Others>

Note that, according to the above-described first to fifth embodiments, the examples are described in which the print data without leaves and the print data for leaves in each color are generated from the submitted print data to the controller **50**, but the print data is not essential. The present invention can be performed by submitting the image data of leaves for generating the print data for leaves in each color to the controller **50** (submitted data processing section **54**). Further, the present invention can be also performed by submitting the print data for leaves in each color to the controller **50** (submitted data processing section **54**).

Furthermore, although the client terminal **30** generates the print job including the print setting information and the submitted data (print data), and transmits them to the controller **50**, the controller **50** may generate the submitted data.

Further, the print data for leaves in each color corresponding to the leaf roll also may be generated by the leaf pressing machine **70**.

Furthermore, according to the above-described first to fifth embodiments, the controller **50** generates the print data without leaves and the print data for leaves in each color, and transmits them to the printer **60** and the leaf pressing machine **70**. However, the present invention is not limited to

those examples. For example, the function of the controller **50** may be applied to the printer **60**, and the printer **60** may also have the function of the controller **50**.

Further, the present invention is not limited to each embodiment described above. Needless to say, various kinds of applications and modifications may be made without departing from the scope of the invention set forth in claims.

For example, the construction of the devices and the systems are specifically described in detail for easier understanding of the present invention in the above-described embodiments. Therefore, all the constructions described above are not limited to be included. Further, a part of construction of one embodiment can be replaced with that of other embodiment. Furthermore, construction of one embodiment can be added to that of other embodiment. Moreover, other construction can be added to, deleted from, and replaced with a part of the construction of each embodiment.

Further, a part or all of the above-described construction, function, processing section, processing method, and the like, can be realized with hardware by, for example, designing an integrated circuit. Furthermore, the above-described construction, function, and the like, may be realized with software by interpreting and performing a program for realizing each function by a processor. Information such as a program, a table, and a file for realizing each function can be stored in a recording device such as a memory, a hard disk, and an SSD (solid state drive), or a recording medium such as an IC card, an SD card, and a DVD.

In addition, a control line and an information line that are considered to be essential for description, are described. All products do not always need the control line and the information line. It can be considered that actually most constructions are connected with each other.

Additionally, in the present specification, the processing step describing the processing in chronological order includes the processing performed in chronological order along the described order, and also the processing performed individually or in a parallel manner, even though it is not necessarily performed in chronological order (e.g., parallel processing or processing performed by an object).

Although the present invention has been described and illustrated in detail, it is clearly understood that the same is by way of illustrated and example only and is not to be taken by way limitation, the scope of the present invention being interpreted by terms of the appended claims.

REFERENCE SIGNS LIST

10*g* gold leaf roll
10*s* silver leaf roll
10*c* copper leaf roll
20 submitted data
21*g***1**, **21***g***2** gold leaf object
21*s***1**, **21***s***2** silver leaf object
22*s***1**, **22***s***2** silver leaf object
23*g***1** gold leaf object (character)
23*s***1** silver leaf object
25N print data without leaves
25G first print data for leaves
25S second print data for leaves
26*t*, **26***u* cutting region
27, **28** image
30 client terminal
31 submitted data
40 print system
41 print data without leaves
42*a* first print data for combined leaves
42*b* second print data for combined leaves
50 controller (information processor)
51 CPU
54 submitted data processing section
60 printer
70 leaf pressing machine
76 first-leaf-pressing processing section
77 second-leaf-pressing processing section
80, **80**A to **80**C, print data
81 image
81*r* rotated image
544 print data for leaves generating section
545 stride-over determining section
546 print data for combined leaves generating section
547 image adjusting section
548 attached-information-image combining section
C boundary
Ci center of leaf image
Cr center point
D**1**, D**2** attached information
M match mark
P sheet

What is claimed is:

1. An information processing equipment comprising a processor functioning as:

a stride-over determining section configured to extract leaf objects from first print data for leaves including a first leaf image in only a first color and second print data for leaves including a second leaf image in only a second color that are usable by a leaf pressing machine in which a first leaf roll in the first color and a second leaf roll in the second color are arranged adjacent to each other in a vertical direction with respect to a sheet forwarding direction of the leaf pressing machine, and determine whether or not any one of the extracted leaf objects strides over a boundary between a first region associated with the first leaf roll and a second region associated with the second leaf roll; and

a print data for combined leaves generating section configured to, when the stride-over determining section determines that there is no leaf object striding over the boundary, perform processing for dividing each of the first leaf image and the second leaf image at the boundary, combining a first divided portion of the first leaf image with a first divided portion of the second leaf image to generate a first combined-leaves image, combining a second divided portion of the first leaf image with a second divided portion of the second leaf image to generate a second combined-leaves image, rotating the second combined-leaves image at a predetermined angle, generating first print data for combined leaves for the first combined-leaves image, and generating second print data for combined leaves for the rotated second combined-leaves image,

wherein the processor is configured to

output the first print data for combined leaves for use by the leaf pressing machine in a first pressing process to press on a sheet the first divided portion of the first leaf image with the first leaf roll in the first color and the first divided portion of the second leaf image with the second leaf roll in the second color, and

output the second print data for combined leaves for use by the leaf pressing machine to press on the sheet, having been subjected to the first pressing process, the second divided portion of the first leaf image with the first leaf roll in the first color and the

second divided portion of the second leaf image with the second leaf roll in the second color.

2. The information processing equipment according to claim **1**, further comprising:

a leaf image adjusting section configured to, when the stride-over determining section determines that there is a leaf object striding over the boundary, perform image processing for changing positions of the first leaf image and the second leaf image so that the leaf object striding over the boundary no more strides over the boundary.

3. The information processing equipment according to claim **2**, wherein the leaf image adjusting section performs image processing for moving the first leaf image and the second leaf image in a vertical direction with respect to the boundary.

4. The information processing equipment according to claim **2**, wherein the leaf image adjusting section performs image processing for rotating the first leaf image and the second leaf image.

5. The information processing equipment according to claim **2**, wherein the leaf image adjusting section performs image processing, after the first leaf image and the second leaf image are moved in the vertical direction with respect to the boundary, for rotating the first leaf image and the second leaf image.

6. The information processing equipment according to claim **4**, wherein an angle at which the leaf image adjusting section rotates the leaf image is an angle at which a size of the sheet becomes minimum in angles at which the leaf image does not stride over the boundary.

7. The information processing equipment according to claim **1**, wherein the boundary corresponds to a center line dividing the sheet into two in a width direction that is vertical with respect to the sheet forwarding direction.

8. The information processing equipment according to claim **1**, wherein the stride-over determining section determines whether or not there is a leaf object striding over the boundary, when the center line dividing the sheet into two in the width direction that is vertical with respect to the sheet forwarding direction does not correspond to the boundary, in a state where each of the first leaf image and the second leaf image is not rotated, and also in a state where each of the first leaf image and the second leaf image is rotated at an angle of 180 degrees.

9. The information processing equipment according to claim **1**, wherein the predetermined angle is 180 degrees or 90 degrees.

10. The information processing equipment according to claim **2**, wherein the leaf image adjusting section performs, when the page layout setting of the first leaf image and the second leaf image is set in multiple imposition, image processing for changing positions of the first leaf image and the second leaf image that are multiple imposed so that the leaf object striding over the boundary in each leaf image to be multiple imposed no more strides over the boundary.

11. The information processing equipment according to claim **1**, further comprising:

a print data without leaves generating section configured to generate print data without leaves that is obtained by excluding the first leaf image and the second leaf image from submitted print data received by the information processing equipment, and

a print data for leaves generating section configured to generate the first print data for leaves including the first leaf image and the second print data for leaves including the second leaf image from the submitted print data.

12. The information processing equipment according to claim **11**, further comprising;

an attached-information-image combining section configured to, when a positioning image for performing leaf pressing processing by the leaf pressing machine is applied as attached information in a region corresponding to a cutting region at a leading end side of the sheet in the sheet feeding direction in the print data without leaves, apply the positioning image at a corresponding position in a sheet feeding direction when leaf pressing processing is performed each on the first print data for leaves and the second print data for leaves.

13. The information processing equipment according to claim **12**;

wherein the attached-information-image combining section is configured to apply information indicating a sheet feeding direction and a sheet feeding order of the sheet so as to correspond to an order of each leaf pressing processing of the first print data for leaves and the second print data for leaves in a region corresponding to a cutting region at a leading end side of the sheet in the sheet feeding direction in the print data without leaves.

14. The information processing equipment according to claim **1**;

wherein the leaf pressing machine further comprises a third leaf roll in a third color arranged adjacent to the first leaf roll and the second leaf roll in a vertical direction with respect to the sheet forwarding direction;

wherein the print data for leaves generating section generates a third print data for leaves including a third leaf image including only leaf object in the third color from submitted print data received by the information processing equipment;

wherein the stride-over determining section extracts a leaf object included in a leaf image in each color in the first print data for leaves, the second print data for leaves, and the third print data for leaves including the third leaf image including only the leaf object in the third color, and determines whether or not there is a leaf object striding over the boundary where the leaf pressing processing in each color is performed, and also determines whether or not the leaf pressing processing is capable of being performed at a time using each leaf roll in each of the first, second, and third colors, and

wherein, when the stride-over determining section determines that the leaf pressing processing is not capable of being performed at a time using the leaf roll in each color, imposition of each leaf image and an order of leaf pressing are controlled so that the leaf roll is replaced minimum number of times.

15. A non-transitory computer-readable recording medium storing a program, which when executed by a computer, causes the computer to perform a process comprising:

generating, from submitted data, first print data for leaves including a first leaf image in only a first color and second print data for leaves including a second leaf image in only a second color that are usable by a leaf pressing machine in which a first leaf roll in the first color and a second leaf roll in the second color are arranged adjacent to each other in a vertical direction with respect to a sheet forwarding direction of the leaf pressing machine;

extracting leaf objects from first print data for leaves and the second print data for leaves, and determining whether or not any one of the extracted leaf objects

strides over a boundary between a first region associated with the first leaf roll and a second region associated with the second leaf roll;

performing, upon determining that there is no leaf object striding over the boundary, processing for dividing each of the first leaf image and the second leaf image at the boundary, combining a first divided portion of the first leaf image with a first divided portion of the second leaf image to generate a first combined-leaves image, combining a second divided portion of the first leaf image with a second divided portion of the second leaf image to generate a second combined-leaves image, rotating the second combined-leaves image at a predetermined angle, generating first print data for combined leaves for the first combined-leaves image, and generating second print data for combined leaves for the rotated second combined-leaves image;

outputting the first print data for combined leaves for use by the leaf pressing machine in a first pressing process to press on a sheet the first divided portion of the first leaf image with the first leaf roll in the first color and the first divided portion of the second leaf image with the second leaf roll in the second color; and

outputting the second print data for combined leaves for use by the leaf pressing machine to press on the sheet, having been subjected to the first pressing process, the second divided portion of the first leaf image with the first leaf roll in the first color and the second divided portion of the second leaf image with the second leaf roll in the second color.

* * * * *